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ABSTRACT

An elementary school guidance counselor serving as a volunteer computer education consultant to a preschool implemented a practicum to introduce computers into a community center's preschool program. Goals were to: (1) provide teachers with the knowledge and understanding needed to operate a computer; (2) acquaint teachers with computer software that corresponded to the hierarchy of reading skills taught in the preschool; (3) instruct teachers in methods for integrating computers into the regular curriculum by writing and use of a computer curriculum guide; (4) provide assistance to teachers by working directly with their students as they used the computer and software. The computer curriculum guide relates particular reading readiness skills to specific computer software and follow-up activities and enables teachers to supplement their regular classroom instruction with computer activities. Practicum evaluation data indicated that outcomes were positive. Numerous related materials, including the 70-page computer-assisted reading readiness curriculum guide, are appended. The guide consists of four clusters of activities focusing on computer literacy, visual skills related to reading readiness, concept formation, and reading skills. Follow-up materials in the form of handouts provide activities supporting the lessons. (RH)

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INTEGRATING COMPUTERS INTO A READING READINESS CURRICULUM FOR PRE-SCHOOLERS THROUGH TEACHER TRAINING AND COMPUTER-ASSISTED INSTRUCTION

BY

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NOVA UNIVERSITY

Integrating Computers into a Reading Readiness Curriculum for Pre-Schoolers Through Teacher Training and Computer-Assisted Instruction

by

Joanne Nemiroff

Cluster XXV

A Practicum Report Presented to the Ed.D. Program
in Early and Middle Childhood
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1988

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PRACTICUM APPROVAL SHEET

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Approved:

May 20, 1988
Date of Final Approval of Report

Polly Peterson, Ph.D.
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TABLE OF CONTENTS

		Page
TABLE OF CONTENTS		iii
ABSTRACT		iv
Chapter		
I.	INTRODUCTION	1
	Description of Community	1
	Work Setting and the Writer's Role	2
II.	STUDY OF THE PROBLEM	5
	Problem Description	5
	Problem Documentation	7
	Causative Analysis	9
	The Related Literature	11
III.	ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS	27
	Statement of General Goals	27
	Behavioral Expectations	28
	Evaluation Instruments	29
	Mechanism for Recording Unexpected Events	30
IV.	SOLUTION STRATEGY	31
	Discussion and Evaluation of Problem Solutions	31
	Description of Selected Solution	35
	Report of Action to be Taken	38
V.	RESULTS, CONCLUSIONS, AND RECOMMENDATIONS	41
	Results	41
	Conclusions	44
	Recommendations	47
	Dissemination	48
REFERENCES		50

Page

Appendices

A. INTERVIEW WITH PROGRAM COORDINATOR..... 54

B. NEEDS ASSESSMENT FOR PARENTS..... 56

C. RESULTS OF PARENT NEEDS ASSESSMENT..... 58

D. TEACHER QUESTIONNAIRE..... 60

E. RESULTS OF TEACHER QUESTIONNAIRE..... 62

F. IN-SERVICE COMPUTER WORKSHOP..... 64

G. IN-SERVICE POST-TEST..... 70

H. RESULTS OF IN-SERVICE POST-TEST..... 73

I. SOFTWARE EVALUATION FORM..... 75

J. WEEKLY LOG..... 77

K. COMPUTER-ASSISTED READING READINESS PROGRAM CURRICULUM GUIDE..... 79

L. CLASS ROSTER..... 149

M. INDIVIDUAL STUDENT SKILL SHEET..... 151

N. GROUP FOLLOW-UP ACTIVITY..... 153

O. EVALUATION OF COMPUTER LITERACY SKILLS..... 155

P. EVALUATION OF VISUAL DISCRIMINATION SKILLS. 158

Q. END OF UNIT/INDIVIDUAL STUDENT PROGRESS REPORT..... 161

R. PARENT REPORT..... 163

S. FINAL TEACHER EVALUATION..... 165

T. SUGGESTIONS FOR TEACHERS..... 167

U. FOLLOW-UP TEACHER INTERVIEWS..... 170

ABSTRACT

Developing a Computer-Assisted Reading Readiness Curriculum for Pre-schoolers and Kindergarten Children. Nemiroff, Joanne, 1988: Practicum Report, Nova University, Ed.D. Program in Early and Middle Childhood. Descriptors: Computer/Microcomputers/Computer Assisted Instruction/ Reading/Reading Readiness/Beginning Reading/Reeading Instruction/Reading Skills/Curriculum/Curriculum Development/ Curriculum Design/Kindergarten/Pre-school Education/ Primary Education/Early Childhood Education/Computer Software/ Programming.

This practicum was designed to improve computer competencies of teachers and pre-schoolers, and assist teachers in integrating the computer into a pre-reading curriculum. The primary goal was to create a computer guide to reinforce and supplement reading readiness skills. Age-appropriate software and follow-up classroom activities accompanied specific skills identified. The second goal was to provide in-service training to teachers to increase their knowledge of computer hardware and software. The third goal was to provide a framework of instruction that teachers could use to implement the program throughout the year.

An interview was conducted with the Program Coordinator to assess the desirability of including computers in the curriculum. A survey was conducted with parents to determine interest in the program and past experiences of their children with computers. A survey was administered to the pre-school teachers to evaluate their willingness to utilize computers to support their classroom reading instruction. A high degree of interest and commitment was expressed by parents and professionals.

The results of the practicum were positive. Teachers were introduced to computer terms and operations. Educational computer applications were reviewed. Teachers developed an awareness of specific software, evaluating its usefulness and appropriateness for their students. The computer-assisted reading readiness curriculum developed was easily followed by teachers, easily integrated into the existing instructional program, and supplemented pre-reading instruction. Children became familiar with computer terminology, the operation of the computer, and were able to independently use age-appropriate software. Parents were kept informed of their child's progress through weekly progress reports.

CHAPTER I

INTRODUCTION

Description of Community

This practicum was conducted in a pre-school setting housed in a community center. The center is a multi-generational agency providing educational, recreational, social, and cultural experiences for the community. It is located in an upper-middle class, suburban neighborhood, outside one of the fastest-growing cities in the Southern United States. The community center provides services for 6,000 members. It has been in existence for 10 years, and strives to create experiences that can be shared by an entire family.

Within the center, a variety of programs are offered. The pre-school program enrolls 132 children, ages 2 months to 5 years. These programs are designed to create a comfortable and easy social introduction to school. Infant day care is provided for children ages 2 months to 2 years. Playgroup, for youngsters 2 years and older, pre-nursery, ages 2-1/2 to 3 years, nursery, ages 3 to 4 years, and pre-kindergarten children, ages 4 to 5 years, participate in this program. Additional programs housed in the community center include:

teen programs that emphasize social, cultural, and physical education activities; adult and senior cultural arts programs; physical education programs for all ages; social services, i.e., home assessment and crisis counseling; single support groups; and vocational counseling.

Work Setting and the Writer's Role

The pre-school program is designed to provide a developmental and experiential approach to learning. Professionals involved in the program attempt to recognize the child as a unique individual, acknowledging differences in the intellectual and emotional developmental stages of children. In addition to providing instruction in readiness skills, the program consists of songs, crafts, stories, and dancing. Gymnastics and physical education classes are provided to develop gross motor coordination. The majority of parents whose children participate in the program are professionals. They are encouraged to take an active part in their child's learning.

The hours of the pre-school program are from 9:00 a.m. to 3:00 p.m. Special enrichment programs designed to meet the needs of working parents are offered. Children participating in the playgroup attend a half-day program,

two, three, or five days per week. Children in the pre-nursery program have the option to attend a half- or full-day program. Nursery and pre-kindergarten age children attend full-day programs. The student/teacher ratio is 18:1 with an aide in each class. There is one administrator whose responsibilities include curriculum development, teacher training and consultation, and overall coordination of programming. All teachers are certified. The majority hold Bachelors Degrees, while several possess Masters Degrees. All teachers and aides attempt to create a warm, nurturing atmosphere to lessen feelings the child might experience as a result of separating from the primary caregiver, and provide opportunities for each child to develop his own self.

The writer is a member of the community center, and serves as a volunteer computer education consultant. The writer is presently employed as an Elementary Guidance Counselor in a neighboring school district. Responsibilities include: Individual and small group counseling, administering of tests for the purpose of determining student needs and referring students in need of special education services, parent consultations, teacher conferencing to provide input and curriculum recommendations for specific children, implementation of cultural arts and career days, administration of group standardized tests, etc. The writer

holds an undergraduate degree in Special Education with a major in Specific Learning Disabilites, a Master's Degree in School Psychology, and 18 hours toward a specialist degree in Computer Education. Other areas of certification include Elementary Guidance and Counseling, and Elementary Education, grades K-6.

The writer has held positions in the local school district since 1973. Previous positions include: teaching a resource class for children with learning disabilities, school psychologist for a demonstration school composed of children with significant learning disabilities, and school psychologist within the public school sector.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

As part of the after-school enrichment program, children utilize 10 Apple IIE computers which are housed in the center. An independent contractor is hired to provide instruction for these children. Students enjoy this, and informal parent questioning revealed that students are using this knowledge to work on computers both in their homes and in their schools.

During the school day, when these students are in their home schools, the Apple IIE computers, which are housed in a building adjacent to the pre-school program, are not being used. The pre-school program espouses a philosophy of providing the individual child with a well-rounded educational experience, exposing him/her to new and exciting materials, at all times recognizing individual needs. Computers could be an integral part of this program. Computers, if utilized properly, could serve as a valuable instructional tool to supplement classroom learning. Initial skills taught with manipulatives and through demonstrations could be reinforced using the computer. Computers could be

used during circle time for language experience. They could be used for small group instruction, as well as during free time as an independent activity. However, due to lack of familiarity with the operation of the computer and software appropriate for the pre-school child, this instructional tool is not utilized. Teachers lack basic computer skills and knowledge to identify those areas of the curriculum that could be supplemented and reinforced on the computer. As a result, children are not exposed to this technology and new experiental form of learning. They are unable to acquire the skills to acquaint them with the computer due to lack of proper instruction. If teachers were able to impart their knowledge and provide age-appropriate computer software, academic skills, i.e., pre-readiness reading skills, could be enhanced.

In conclusion, the problem addressed by this practicum is that computers are available for pre-school teachers during the school day to supplement their instructional program, but teachers are not utilizing this valuable resource. As a result, children are missing out on a positive and worthwhile learning experience.

Problem Documentation

In order to provide documentation for the forementioned problem, cooperation of the community center program coordinator, and comments from the faculty of the pre-school were solicited. Both professionals and parents were interviewed to obtain an overall picture as to the viewpoint and interest in exposing pre-school children to computers. An interview (see Appendix A) was held with the program coordinator who initially indicated the desire to implement computers into the curriculum, expressing the feeling that this generation of children need to be computer literate and familiar with the keyboard like they are with a telephone. She further stated that the staff does not consist of a person with a computer background to develop curriculum and train teachers, and pre-school enrollment does not warrant the hiring of another teacher trained in computer education. She indicated the need to familiarize the teachers with computer hardware, provide appropriate software, and instruct teachers in methods of using the computer as an integral part of the curriculum.

Parents were given a needs assessment (see Appendix B) to determine their interest in exposing their children to computers at a young age. Ninty percent of parents polled

indicated that their child has not participated in an after-school computer education program. When asked if they were interested in having their child obtain computer knowledge as part of the community school program, 98 percent of the 4- to 5-year-olds parents felt computers at this age would be a positive learning experience. Others indicated that they felt their child was too young to benefit from this experience. Parents did recognize the ability to use computers in supplementing reading and math readiness skills taught in the pre-school. Many indicated informally their inability to work on the computer with their children due to their own lack of knowledge. Ninety-eight percent of parents with children ages 4 to 5 years, and 80 percent of parents with children ages 3 to 4 years, stated that they were in favor of adding computer education to the pre-school program (see Appendix C).

Recognizing that the teachers would be the ultimate implementors of the computer instructional program, and need to become familiar, not only with the computer hardware, but with the software, in order to provide individualized instruction, a teacher questionnaire was administered to determine the commitment on the part of the teachers (see Appendix D). Of 10 teachers responding to the questionnaire, 9 indicated that they had no prior training in

computer education, but would be willing to participate in a computer education program to supplement reading readiness skills. All 10 teachers indicated that they did not presently utilize the computer, but viewed the computer as a desirable and important part of an education program. These teachers all recognized that pre-reading readiness skills taught in the classroom could be reinforced on the computer, and that pre-schoolers would benefit by acquiring basic computer knowledge (see Appendix E).

In analyzing comments made by the community center program coordinator, and the faculty and parents of children attending the school, it was easily recognized that computers were seen as a desired addition to the present curriculum, and that teachers were receptive in obtaining the necessary training to implement a successful program.

Causative Analysis

Despite the availability of computers during the school day, computer education was not a part of the community center pre-school program. There were several causes for the lack of use. The primary cause was found in the lack of teacher training and knowledge in operating the computer. When teachers are not secure in their own knowledge of a

particular subject, they are generally wary to introduce it into the curriculum. As a result, they demonstrate an inability to instruct students. Many adults, being unfamiliar with the computer, develop a "phobia" toward it, and hesitate to experiment with its use. Learning to use the computer often seems "scary" to an adult. A child approaches this experience with great enthusiasm.

A second major reason computers were not used was the lack of familiarity with computer software. Many companies produce "educational software"; however, not all programs are age-appropriate or valid in their educational claims. Teachers needed to become familiar with educational materials on the market, and develop methods for evaluating software. In this way, a particular computer program could be chosen to supplement the learning of a specific skill. Once teachers choose specific software, they must become familiar with options within the program to assist children in independently using the disk.

A third major problem was related to the implementation of computers. Teachers needed to acquire knowledge in methods of integrating computers with regular classroom instruction. Teachers must identify those skills which they want to introduce using an experiential approach, and then identify specific computer programs which reinforce those

skills. It is only in this way that computers can become an integral part of the curriculum, rather than a substitute for hands-on experiences.

If these problems were addressed, students would obtain experience in operating the computer, as well as instruction in pre-reading readiness skills using age-appropriate educational software.

The Related Literature

With the computer revolution affecting the public school system, as well as the home environment, educators of pre-schoolers are questioning the impact computers will have on young children. Issues and controversies relating to the developmental needs of children are raised in determining the appropriateness of computers with this age group. Ways in which "computer involvement might promote or hinder cognitive, language, physical, social, and emotional development in young children" (Hyson & Eyman, 1986, p. 56) must be addressed. If computers are to be used by pre-school teachers, proper training must eventually be implemented at the college level for teachers to become adequately prepared to teach children. Methods of integrating computers into the pre-school curriculum must be analyzed in terms of the goals

of the program, the "content-developmentally appropriate integrated learning experiences . . . that facilitate development and learning in all areas; and methodology (including planning for individual needs; and understanding a variety of curriculum models)" (p. 56).

The purpose of this review is to analyze the literature on the use of computers with pre-schoolers. Both advocates of computer use, as well as those opposed, are reviewed in terms of the issues mentioned above. Specific schools and programs that have successfully integrated computers into early childhood classrooms are identified. Recommendations for teachers utilizing computers with young children are discussed.

For computers to promote an appropriate and successful learning experience, the developmental stage of the child must be identified. Piaget refers to the preoperational period (age four or five to seven) as being an intuitive stage. At this point, he observes the child as "lacking the logical, reversible character of true conceptual thinking" (Pulaski, 1971, p. 121). However, gradually throughout this stage, reasoning is becoming less tied to specific experiences, and the ability to classify is becoming better. Hands-on experiences are important as the child constructs his own meaning to the world he experiences.

> Barnes and Hill (1983) argue that children must reach the stage of concrete operations before they are able to work meaningfully with computers (usually between the ages of six to eight). Until children can classify with two dimensions, deal logically with equivalencies (reversibility), and conserve (observe change), they do not understand the significance of their actions with the computer. (Brady & Hill, 1984, p. 53)

Opponents to computer literacy are concerned that most pre-schoolers are pre-operational, and should be learning concepts through interaction with manipulatives in a spontaneous manner, rather than allowing computer programs to control their activities. The active participation is considered necessary for integration of cognitive skills. Karen Burg (1984, p. 31), however, who teaches kindergarten at the child development laboratories at the University of Connecticut, recognizes that "microcomputers can provide children with developmentally appropriate experiences." She identified programs in which the child has an opportunity to match shapes, letters, colors; count; add and subtract with visual cues; draw and color with the use of a joystick to promote fine-motor development; acquire specific vocabulary such as beside, below, etc., through the use of graphics; and develop auditory skills with the use of voice synthesizers.

Burg emphasizes, however, that in order for this to occur, the teacher must play an important role in recognizing the developmental capabilities of the children he/she works with, and tailoring the computer programs to meet the needs of the individual child through his/her own programming skills, rather than relying on pre-packaged commercial software. Teachers and parents must also have realistic expectations of their child's capabilities at each stage of development. Young children are capable of successfully interacting with the computer utilizing the keyboard to respond to visual stimuli. However, "five- to seven-year-olds intellectual development is not sufficient for programming. Programming requires formal logical reasoning (Favaro, 1983). The five- to seven-year-olds thinking depends more on trial and error than logic" (Burg, 1984, p. 32).

Papert (1980, p. 7), recognizing the characteristics of the child in the pre-operational stage of development suggests that "computers may be a vehicle for making certain concepts 'simple and concrete' for intuitive thinkers. Computers may serve as a transition from actual objects to mental representations."

If professionals are cognizant of the developmental growth of the children they work with, what impact do computers have in the areas of cognitive, language, social, and emotional growth of these youngsters?

A field test was conducted at the Bing School, a laboratory facility at Stanford University, to determine whether pre-schoolers could use the computer and progress through a sequence of lessons (Piestrup, 1981). Pre-reading skills and pre-math skills were emphasized. Visual discrimination skills were tapped by having children as young as three explore and pick out letters on the keyboard. Using the program Kindercomp, by Spinnaker, children developed observational skills by recognizing likenesses and differences amongst shapes, letters, and patterns. Spatial concepts, such as "above," "below," "left," and "right," were taught with the use of certain computer programs. Children were required to focus their attention and follow directions as they interacted with the computer. Findings suggested that computer programs did address, and were an effective learning tool, in teaching cognitive skills.

Another study was conducted in a pre-school and kindergarten classroom at the Rainbow School, a private non-profit school in California. The emphasis of this program was to obtain "software that would enhance children's thinking skills in comprehension, memory, evaluation, and creativity" (Anselmo & Zinck, 1987, p. 23). These cognitive skills were determined to represent essential aspects of learning. Findings suggested that four-, five-, and six-

year-olds were interested in using the computer, and that the computer supplemented the cognitive skills that were further reinforced through age-appropriate hands-on activities. These authors emphasized, however, that the computer cannot be used as a substitute, or presented prior to experiential learning activities. "Children must already have a broad background of concrete experiences before they can find meaning in the more abstract computer activities" (p. 26).

Goodwin, Goodwin, Nansel, and Helm (1986, p. 350) also conducted an experimental study to investigate the impact computers have on the acquisition of pre-reading concepts of pre-schoolers. The study was implemented "in a child care center on an urban campus that includes three institutions of higher education." Three specific computer programs were used for the purpose of teaching letter matching and recognition. These programs were targeted to children ages three to six. Varying degrees of assistance were provided by adults. Limitations and constraints existed in the available time children had to choose the software they were interested in using. Amongst those findings reported included "the study demonstrated that microcomputer experiences, as herein structured, had no effect on pre-reading skills, and that whether or not the children had adult assistance made little difference" (p. 355).

These studies create questions in the reader's mind as to why some children appear to gain cognitive understanding of psycho-linguistic and/or pre-reading readiness skills, while other children do not. Anselmo and Zinck (1987) emphasize the importance of using the computer as a supplementary tool, rather than relying on the computer as a primary means of instruction. This focus could impact learning.

Questions must also be raised as to the impact a child's physical growth has on their ability to use a computer. Children must have the ability to utilize visual-tactual skills in order to respond on the keyboard to what is seen on the monitor. "Young children do not have fully developed motor skills, particularly eye-hand coordination. Their reaction time is slow. Yet, many computer games require manual dexterity, quick judgment, and quick reaction time" (McCrory, 1984, p. 7). Issues such as visual strain and fatigue in young children must also be addressed.

Despite issues that arise related to physical maturation and developmental growth, children appear to enjoy the computer, find it motivating, and a means of interacting both on a one-to-one, child with computer, and with peers. "Early fears that the use of microcomputers would isolate children, reduce social interaction, and hamper social-emotional

development appear not to have been borne out" (Brady & Hill, 1984, p. 54). Children working on the computer often work in pairs or small groups. Those who can read often assist those who cannot. Children share times in responding, and work cooperatively in problem-solving activities. Degree of interaction amongst children is often related to the arrangement of chairs at the computer, as well as the type of software selected. Feedback given to a child's response is generally immediate and positive, enhancing self-esteem, and creating a sense of competency amongst one's peers. Quiet, shy children often talk with other children when working together at the computer. This experience can have the effect of stimulating language development in a reticient child. "Some software intended as simulations can also be used as vehicles for the direct teaching of language" (Blatt & Jaworski, 1986, p. 72). Children are presented with open-ended stories or stories with multiple-path endings, and asked to respond with an appropriate choice. Oral language and communication skills are enhanced as children talk about their ideas with each other.

In one classroom, at the child development laboratory at the University of Connecticut, the computer is used to encourage children to speak who have developmental lags in their language development. The teacher writes a program

requesting a picture to appear on the screen. The child then invents a story related to that picture, records his voice, and later replays it.

The West Virginia University Child Development Laboratory has also developed a program in which computers are used with three- and four-year-olds as a complement to their language experiences. Children, after initially drawing pictures by hand, are asked to use the computer to draw or scribble a picture. Using the printer, the teacher types and prints a story dictated by the child to accompany the picture. Additional programs are used emphasizing initial sounds in which the child presses a key on the computer and a picture that begins with that letter appears on the screen. "The results of the study indicate that children did dictate numerous words to the teacher about their hand-drawn works, but they verbalized significantly more with the computer pictures" (Warash, 1984,p. 7).

Another study was conducted in Southern California in which the Language Experience Approach was used with and without microcomputer intervention with five-year-old youngsters. A speech synthesizer was used in conjunction with the computer. Children who initially experienced difficulty learning to read appeared to experience great success utilizing the computer and speech synthesizer. "The

visual, auditory, and kinesthetic nature of the micro-computer lesson seems to meet the needs of all types of learners, regardless of modality" (Casey, 1984, p. 15).

Utilizing the computer in a small group situation appears to enhance socialization, as well as language development. If teachers are cognizant of the developmental growth of children, recognizing limitations based on physical considerations and maturation, computers could have a favorable effect on children's learning. However, teachers must become adequately trained in computers, determine appropriate methods of integrating computers into their classrooms, and become familiar with age-appropriate software, if positive, rather than negative, results are to occur.

In order for teachers to become computer literate, in-service training must be conducted amongst practicing teachers, as well as provisions made for computer literacy classes in early childhood teacher education programs.

Although computer literacy is increasingly required for elementary and secondary teacher certification (Bitter, 1983; Kull & Archambault, 1984), as of Spring, 1984, few states had computer literacy requirements for Early Childhood Education Certification. Perhaps as a result, relatively few of the colleges and universities surveyed

> (23 institutions, or 19 percent) required computer literacy in their early childhood teacher education programs. (Hyson & Eyman, 1986, p. 55)

Institutions cite such obstacles as lack of instructors, and excessive cost of computer access time in explaining their lack of computer literacy classes. In order for these programs to be economically feasible, "computer literacy should be an integrated part of the students' total education experience" (p. 58). In this way, the student teacher learns to utilize the computer in an organized manner as one vehicle of instruction.

At the High/Scope Demonstration School, in Ypsilanti, Michigan, computer technology is integrated into the pre-school and kindergarten curriculum. "When computers are used in the learning environment, we have found them to be a powerful learning device that activates cognitive development and positive social interaction without harm to young children" (Buckleitner & Hormann, 1987, p. 338). Computers serve various functions within the classroom. They are offered as a free-choice activity, used in small-group instructional activities, and used to promote language experiences during "circle time." "The computer is added to the environment in support of the curriculum goals--not as a goal in itself" (p. 338.).

Teachers utilizing the computer to support curriculum goals select computer programs that can teach, tutor, or become a tool for the child. These programs, referred to as computer-assisted instruction, or CAI, consist of drill and practice, tutorials, and simulations.

> Several extensive reviews of the research concerning the effectiveness of computer-assisted instruction have been conducted (Billings, 1983; Bracey, 1982; Chambers & Sprecher, 1980; Edwards, Norton, Taylor, Weiss, & Dusseldorp, 1975; Fletcher, Suppes, & Jamison, 1982; Forman, 1982; Hartley, 1978; Kearsley, Hunter, & Seidel, 1983; Madgidson, 1978; O'Donnell, 1982B; Visonhaler & Bass, 1972). (Clements, 1985, p. 27)

Among those results reported included: "CAI usually yields improved performance in less time than traditional instruction; students given CAI lessons may not retain as much information; it is still not known why CAI is effective, or how to individualize instruction or maximize the positive effects" (p. 27). Findings appear to be varied in the effect CAI has on young children. Recognizing limitations, teachers utilizing this form of instruction must be totally familiar with the particular program being used, and the capabilities of the child using it.

Draper, Cahoon, and Clayton (1986, p. 3) point out the importance of making the computer fit the child, rather than the child fit the computer. At Brigham Young University, these authors evaluated the use of robotic devices and artificial intelligence programs to determine the possibilities of the computer "to relate to children through conversation, visual representation, and movement." Initial reports suggest that technological advances, to date, cannot accomplish efficiently the goals of a quality pre-school program. However, the impact of robotic instructors in teaching some children certain aspects of the curriculum was noted.

Opponents to computer-assisted instruction with pre-schoolers considered computer-assisted instruction as taking the form of "glorified workbook exercises. Although enhanced with graphics, animation, and sound, they, nevertheless, presented learners with 'pages' of drill and practice, as well as tutorial instruction, in the same way as conventional basal reading program workbooks do" (Newman, 1984, p. 758). There have, however, been many innovative software programs developed which present skills in a meaningful way, and provide useful experiences for children. It is the responsibility of the teacher to identify and analyze computer programs to determine those which would have a positive impact on children.

In attempting to individualize a child's instruction using the computer, the teacher can identify where the child is currently functioning along a continuum of developmental and cognitive skills. Software can then be evaluated to determine if the computer program is consistent with the curriculum goals. Specific considerations must be addressed. The teacher should determine the age and level of learning the program is designed for, and the extent to which the program achieves its objectives; the ease of following directions when reading is not involved; the extent of positive reinforcement provided; the degree to which the child is challenged, perceives the program as fun, and is able to hold his attention; and the quality of the program in terms of large, clear print, sound, and graphics. Several authors have identified specific computer programs recommended for computer-assisted instruction. Baker (1984) provides a listing of software/title, subject/level, and description of programs for early childhood education. Guidelines for planning the computer learning environment, as well as specific computer activities, are provided. Important steps to follow include:

> Computer awareness--discussing the ways a computer functions and its care; computer literacy--introducing terminology and keyboard experiences; determining and

> selecting techniques and software to be used for each session; writing a teaching plan for each activity; and evaluating and recording each child's progress. (p. 9)

Utilizing the outline provided increases the likelihood of meaningful computer classroom experiences. However, "observers of the current educational computing scene seem generally to agree that most available educational software, both commercially-designed and teacher-developed, is rather disappointing" (Coburn, Kelman, Roberts, Snyder, Watt, & Weiner, 1982, p. 113). In the field of early childhood education, "research and development is accelerating in the construction of programs which enable pre-school children to get and give instructions without reading skills" (Taylor, 1983, p. 7).

Despite those opponents who express concerns in implementing computers with pre-school children, many programs throughout the country have successfully done so, and should be considered models for further research.

"Writing to Read" is a computerized writing and reading program used with IBM computers. "The computers in the 'Writing to Read' program serve not only as motivators and initiators for the experiences, but also serve as the drillmaster, the monitor, the reward-giver, and the diagnostician for the children's progress" (Spillman & Lutz,

1986, p. 266). A language-experience approach is used to promote writing and reading activities, allowing the child to create meaningful stories without concern for spelling, and providing children opportunities to write the sounds they hear.

Despite the research that has been conducted in the area of computer use with pre-school children, questions and issues continue to arise. Teachers and administrators considering the implementation of computers must assess the contributions that computers can make to their curriculum, and to the individualization of children's programs as they relate to the child's specific developmental and cognitive stage of growth. n order to successfully integrate computers into the classroom, teachers must obtain training in computer literacy, choosing appropriate computer software, and methods of using software to supplement learning. Teachers must become cognizant of the limitations of the computer, as well as develop realistic expectations for their students. Methods of using the computer to enhance socialization and language experiences should be identified. Of utmost importance, however, is the teacher's understanding that computers are only a tool to supplement the rewarding, hands-on experiences that only a teacher can provide.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Statement of General Goals

In order to successfully implement computers into the community center pre-school program, both teachers and students had to develop familiarity with the computer. Consequently, the first goal of this practicum was to provide teachers with the knowledge and understanding to operate a computer. The second goal was to acquaint teachers with appropriate computer software that corresponds to the hierarchy of reading skills taught. Once teachers develop an awareness of computer hardware and software, likelihood of implementation increases. The third goal was to instruct teachers in methods of integrating computers into the regular curriculum by writing and providing them with a computer curriculum guide. This guide correlates a reading readiness skill with specific computer software and follow-up activities. Teachers using this guide will be better able to supplement their regular classroom instruction with computer activities. A fourth goal was to provide assistance to teachers by working directly with their students, providing guidance in the workings of the computer and specific educational software.

Behavioral Expectations

In analyzing the literature, it was apparent that the computer is often not used appropriately with children because teachers are not computer literate, do not recognize the cognitive and developmental stages of a child's development, and experience difficulty evaluating software to develop realistic expectations for children. The following specific objectives were chosen to provide teachers with as much assistance as possible in implementing a computer program.

1. Eighty percent of teachers participating in a mini-workshop will demonstrate a knowledge of computer hardware and operational techniques with 80 percent accuracy as evidenced on a quiz.

2. Eighty percent of teachers participating in a mini-workshop will demonstrate knowledge of particular software that can be integrated into their classroom activities with the use of a prepared curriculum guide. Mastery of this objective will be evidenced by 80 percent accuracy when responding to a prepared quiz.

3. Over a period of 10 weeks, 80 percent of teachers, after working with a variety of software, will be able to evaluate unfamiliar software, determine the particular skills emphasized, and integrate the new software into the curriculum with 80 percent accuracy through informal questioning.

4. Over a period of 10 weeks, and under teacher guidance, students will progress at their own rate through the hierarchy of reading readiness skills, as outlined in the prepared teacher guide, progressing to the next level by demonstrating 80 percent accuracy on follow-up materials that correspond to the skill taught, and/or responding to teacher commands of operation.

Evaluation Instruments

In order to assess teacher familiarity with computer terminology, operational techniques in using computer hardware, and knowledge of specific software and its use, teachers were instructed verbally to perform certain tasks, with methodology explained during instruction. Teachers were then given an objective test requiring a yes or no response to determine retention of information. The test was untimed, and served both as a learning tool and reinforcement (see Appendix G).

Objective three was measured by a written exercise in which teachers were presented with a particular computer program and required to evaluate its usefulness for pre-schoolers according to particular criteria (see Appendix I). Teachers completed the questionnaire to determine what specific pre-reading readiness skill was tapped.

In order to assess student progress and acquisition of reading readiness skills, follow-up games and activities that correspond to the particular skill taught were presented on an on-going basis, requiring 80 percent accuracy of response for the child to progress to the next readiness skill established in the curriculum guide. These follow-up activities were organized as an integral part of the computer curriculum guide.

Mechanism for Recording Unexpected Events

In order to address unexpected issues and concerns that arose during the duration of the practicum, the writer kept a log of each session (see Appendix J). The log contained a summary of the skills introduced, the specific software used, follow-up activities suggested, and any difficulties experienced. In this way, a record could be kept to avoid duplication of programming. The log also indicated any concerns or requests expressed by the classroom teacher, and actions taken by this writer.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

In order to successfully implement computers in the pre-school classroom, teachers must become computer literate and able to impart their knowledge to students at their level of understanding. Ideally, as pointed out by Hyson and Eyman (1986) in their discussion of computer literacy in early childhood teacher education programs, classes should be offered at the college level integrating computer literacy into methods courses within specific subject areas. However, many teachers currently practicing are in need of introductory classes to acquaint them with the use of the computer. One possible solution to the lack of teacher training would be to provide these teachers with in-service programs providing information as to the operation of the computer, as well as introduce them to specific age-appropriate software. Questions must be raised, however, to determine the amount of time teachers would require to become adequately familiar with the capabilities and limitations of computer hardware and software to meet children's individual needs. Karen Burg, who teaches kindergarten at the Child

Development Laboratories at the University of Connecticut, indicates that in order for children to master appropriate developmental skills the teacher must play an important role in tailoring the computer programs to meet the needs of the individual child through his/her own programming skills, rather than relying on pre-packaged commercial software. Observers of the current educational computing scene seem generally to agree that "most available educational software, both commercially-designed and teacher-developed, is rather disappointing" (Coburn, Kelman, Roberts, Snyder, Watt, & Weiner, 1982, p. 113). A solution to this problem is to provide in-service to teachers on an on-going basis. Questions and concerns can be addressed, and programming skills can be taught to supplement existing software. In this way, teachers could meet the needs of students as described by Karen Burg.

Another possible solution to help teachers gear their instruction and recognize the developmental needs of the individual child is to provide them with a curriculum guide that would correlate developmental pre-reading readiness skills with specific computer software. Despite a teacher's limited knowledge, he/she could identify appropriate software to teach or supplement the teaching of a specific skill. In a pre-school and kindergarten classroom at the Rainbow

School, in California, four specific cognitive skills were identified (comprehension, memory, evaluation, and creativity), with software provided to enhance these skills. Findings suggested that the computer did supplement the learning of these skills when accompanied by hands-on learning experiences. Computers were less effective when not reinforced by additional classroom activities. Computer-assisted instruction is often seen as a form of glorified workbook exercises providing rote learning rather than meaningful experiences. Software must, therefore, be evaluated to determine if the computer program is consistent with the curriculum goals. Instructing teachers on the operation of the computer and appropriate software is, therefore, not enough. Teachers must learn how to incorporate the computer into the experiential learning provided in their everyday classroom activities in a meaningful way.

One possible solution to provide teachers with assistance in utilizing the computer to supplement learning would be to obtain the services of a consultant to provide guidance in coordinating total classroom activities. Another possible solution would be to provide classroom teachers with a handbook that correlates a specific pre-reading readiness skill, the software that corresponds to that skill, and

classroom activities that can be implemented by the teacher to reinforce that skill. "Writing to Read" is a pre-packaged, computerized writing and reading program used with IBM computers. Children create meaningful stories using a language-experience approach with the computer. Children then participate in follow-up activities that enhance writing and reading skills. This total approach to learning has been proved to be motivating and successful in diagnosing and promoting children's progress.

Teachers, however, often complain that they have too much work, and that implementing computers into their classrooms will only serve to increase their workload. One possible solution to this problem is to hire a teacher specifically to work with students on the computer. However, when a person other than the teacher who is familiar with the child's specific strengths and limitations works with that child, much time is lost in determining the child's ability to follow directions and utilize specific programs. In order for the computer teacher to meet individual needs and enhance learning, close contact must be kept with the child's teacher. Specific skills the teacher wants emphasized, as well as the progress of the child must be discussed.

Another solution to lessen teacher time in working with children at the computer is to initially instruct certain capable children as to the operation of the computer, and

then use these children as peer teachers. Observations made by Brady and Hill (1984) suggest that those children who can read often assist those who cannot. Children share times in responding, and work cooperatively in problem-solving activities. Teachers, however, must provide children with age-appropriate and relevant software to utilize at the computers.

Description of Selected Solution

The teachers working at the community center pre-school had little or no understanding of the operation of a computer. In order for the computer to have some meaning, they needed not only to learn to use the computer, but also recognize its capabilities in supplementing classroom activities, and obtain some familiarity with computer software designed for pre-schoolers. In this way, teachers could approach the computer without trepidation, and introduce its use with some understanding. In order to acquaint teachers with computers, and provide them with an overview of software available, a one-day, in-service was provided addressing the following topics: Computer terms and operations, educational computer applications, and courseware evaluation. Teachers were provided with evaluative

instruments to be utilized when analyzing the appropriateness of computer software. In this way, they would not only become familiar with appropriate software available, but also discover ways to recognize the usefulness of new software.

Recognizing the lack of familiarity with the computers and the abundance of software on the market, it is difficult for teachers to instruct students on the use of the computer, and provide them with programs that supplement classroom learning. For an initial period during this school year, the writer worked with the four-year-olds at the pre-school on an individual basis in the computer lab of the community center. In order to motivate the classroom teacher to utilize the computer and ensure their ability to continue implementaton at a later date, teachers were present during this instruction. In this way, both students and teachers obtained meaningful hands-on experience. Peer instruction was encouraged once students learned how to successfully operate the computer.

In order to provide computer instruction that supplemented the specific skills a child was being taught in the classroom, the teacher identified the pre-reading readiness skill the child was working on based on a hierarchy of reading readiness skills established by this writer. An individual student progress sheet was kept by the computer instructor identifying the specific skill the child was

working on, the date the child used the computer, and the specific software used. In this way, the child's progress would be individualized, and would supplement the skills being taught in the classroom. Both the computer teacher and the classroom teacher were aware of, and in agreement with, the skill being taught. In order for the classroom teacher to have an overview of the skills being taught on the computer for each of his/her students, a class roster was provided by the computer teacher. This was the most appropriate solution to assure coordination of the computer curriculum with the goals of the classroom teacher, and minimize the possible negative effects of two instructors working separately with a child.

In order to further meet the individual needs of children and increase the likelihood that teachers would be able to utilize the computer to supplement classroom learning without the assistance of a computer teacher, a curriculum guide of computer-assisted pre-reading readiness skills was established. The curriculum guide was designed to promote learning of developmental skills important in reading. It identified a specific skill, developed related objectives, identified software that taught and reinforced that skill, and provided follow-up classroom activities that served to integrate the specific computer objective with a hands-on classroom learning experience. Follow-up materials also

served to assess a child's understanding of a particular skill. Once teachers had a good working knowledge of the computer, and became familiar with this computer guide, this writer could then serve as a resource to teachers.

By initially providing instruction to teachers and students, and then furnishing them with a curriculum that integrates pre-reading readiness skills, computer software, and follow-up classroom activities, teachers would be able to instruct students using appropriate software, meet the individual needs of children using the computer in a productive and relaxed manner, and integrate these skills with the regular classroom curriculum. Presentation of materials to teachers for future implementation occurred in a slow, progressive manner to build their confidence in using the computer. This appeared to be the most appropriate solution if teachers were to become motivated to utilize these computers over a period of time.

Report of Action to be Taken

During an initial two-week period, a computer curriculum guide was developed outlining specific skills and objectives important in reading readiness (see Appendix K). The computer software that was already available at the community

center was analyzed in order to find those programs which corresponded to the specific skills to be taught. Appropriate software was listed in the computer guide, as well as follow-up activities which could be integrated into the existing curriculum. During the duration of the practicum, additions and modifications of the curriculum guide were made as needed.

In order to acquaint teachers with computer hardware, software, and methods of integrating the computer with on-going classroom activities, all teachers and aides employed by the community center pre-school program participated in a one-day, in-service workshop. This workshop was conducted after the initial two-week period, and prior to working with the children (see Appendix F).

During the next two and one-half months, this writer conducted bi-weekly computer instructional classes with the four-year-old pre-schoolers. With the participation of the teachers, four groups of ten students were listed on a class roster (see Appendix L), and seen for approximately 30 minutes per group once a week. For the first two weeks, students were exposed to the operation of the computer in an attempt to develop computer literacy. Games were initially presented on the computer to promote interest and motivation. Once students were familiar with the operation of the computer, and were able to place a computer disk into the

disk drive, individualized student programs on the computer were to be established based on the hierarchy of pre-reading readiness skills outlined in the computer curriculum guide. The writer would assist students in following directions indicated on the particular disk, and responding to difficult skills presented. At the end of each week, the writer was to provide the teacher with an on-going evaluation of student's progress on specific skills (see Appendix M), and indicated follow-up activities that should be done to supplement the child's program in the regular classroom (see Appendix N). A copy of the child's progress report would be sent home each week (see Appendix R).

During sessions conducted with students, procedures and practices were reviewed with the participating teacher so that he/she could continue with the instruction after the practicum period. At the end of three months, this writer met with teachers to discuss their ability to independently utilize the curriculum guide to provide computer-assisted instruction in reading readiness. A survey was given to teachers to determine the value of sessions with students, their understanding of computer software, and their interest and ability in using the computer guide (see Appendix S). An interview was conducted with several teachers one month after they began implementing the computer curriculum on their own to assess areas of concern (see Appendix U).

CHAPTER V

RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Results

The purpose of this practicum was to familiarize teachers and students with the use of the computer, and enhance their ability to successfully utilize the computer in the future. Objective One, which recognized the teachers' ability to demonstrate a knowledge of computer hardware and operational techniques, was assessed on a continuous basis throughout the 10-week period by asking teachers to perform certain tasks on the computer, i.e., load a new program utilizing the command PR#6. Objective One was further assessed by responses on a test following the in-service training session (see Appendix H). Once commands and methodology were learned, teachers demonstrated confidence in the operation of the computer, and were able to answer student questions. Objective Two, identifying teachers' knowledge of demonstrated software and the skill which that software taps, was measured by scores on a quiz at the end of the in-service training session. Scores of at least 80 percent accuracy were met by all teachers and aides participating in this workshop (see Appendix H).

During the in-service training sessions, teachers were introduced to new software and given criteria for evaluating that software. Qualitative analysis of responses suggested that teachers demonstrated awareness of those factors which were important in developing good software, and could enhance the presentation of the software for pre-schoolers. Throughout the 10 weeks in which the computer curriculum was implemented with students, teachers became familiar with additional software, and were able to identify the particular pre-reading readiness skill emphasized. Through informal questioning, teacher competency in recognizing that skill was noted. Understanding of the process areas in the curriculum guide and specific software within those areas was further indicated by responses on a final evaluation form (See Appendix S). All teachers questioned felt competent in using the curriculum guide, and able to integrate the new software into the curriculum. In order to determine the long-term usefulness of the computer guide, and the teachers ability to utilize this guide on their own, interviews were conducted with the teachers of the four-year-old classes (see Appendix U). These teachers indicatd that they found the curriculum guide easy to follow. They felt comfortable with their own knowledge of the computer, and followed the framework of instruction observed during the previous 10

weeks. They spent approximately 15 to 30 minutes identifying the skill to be taught and previewing software prior to working with students. These teachers indicated that they felt the guide was comprehensive, with problems experienced related to faulty disks rather than the curriculum. Two teachers felt adequate worksheets were provided. One teacher, however, indicated she would have preferred additional follow-up worksheets to further reinforce skills. She felt that four-year-olds needed much repetition. Specific concerns related to the curriculum were that the print on several follow-up worksheets was too small, and Ernie's Quiz by Children's Computer Workshop was too difficult for some students. In general, these teachers were extremely positive and satisfied with the computer curriculum guide.

Objective Four, indicating that students will progress at their own rate through the hierarchy of reading readiness skills, progressing to the next level by demonstrating 80 percent accuracy on follow-up materials that correspond to the skill taught, and/or responding to teacher commands of operation, was partially met. The skill tapping computer literacy was measured by each child's response when naming parts of the computer, and methodology involved in loading a disk. Eighty percent of students did demonstrate skills necessary in the area of computer literacy. Due to the

inability of students this age to read directions, and/or retain oral directions given, the group progressed as a whole throughout the other process areas. Follow-up materials were administered to determine understanding of skills taught with at least 88 percent accuracy demonstrated (see Appendices O & P).

Conclusions

Methods implemented to increase student understanding of material presented and retention of skills were successful. Students initially sat in a circle, and the instructor reviewed information previously taught. The instructor then introduced the skill and demonstrated the disk that would be used that day. Through repetition, students retained terminology and were able to independently perform tasks on the computer. A similar program was established at the High/Scope Demonstration School in Ypsilanti, Michigan, in which computers were used in small group instruction, as well as during circle time. Students participating in the sessions at the community center were encouraged to work in pairs. Peer teaching was found to enhance understanding. By participating in these sessions with their students, teachers became familiar with the method of introducing new materials, as well as reviewing information taught. Teachers were

provided with a complete curriculum guide which they observed the instructor implementing throughout the sessions, further enhancing their ability to continue implementation throughout the year. The curriculum guide attempted to identify pre-reading readiness skills, and determine computer software that enhances the learning of that skill. A group follow-up activity sheet was given to the teacher at the end of each session with suggestions of follow-up activities (see Appendix N), rather than individual student skill sheets (see Appendix M), which was originally planned, due to the lack of individualization. Follow-up activities that corresponded to particular skills were provided in an organized manner in the curriculum guide which teachers could use in their classrooms and/or use to assess student progress. At the end of the practicum period, additional suggestions were given to teachers to assist in their understanding of the curriculum guide (see Appendix T). Teachers were encouraged to supplement follow-up activities with teacher-made materials. By initially providing teachers with an in-service workshop to increase their knowledge of the computer and computer software, by encouraging their participation in classes with students to identify methodology in presenting software and integrating that software into the curriculum, and by having a follow-up session in which suggestions were given to assist

teachers in using the curriculum, it became obvious that teacher objectives were clearly met. If teachers set time aside to preview software prior to working with students, and become thoroughly acquainted with the curriculum guide, they should experience great ease in presenting a well-rounded early childhood computer curriculum.

Student objectives were partially met. Students did develop a working knowledge of the computer. They were able to name the parts of the computer and load a disk on their own. Visual skills were enhanced by using the computer to reinforce such skills as visual discrimination and visual closure. Due to time limits and the inability of children to read and retain directions, students participated in group rather than individual activities. Several children were able to work on their own, and they were encouraged to go back and do previously introduced disks after completing their daily assignment. Others experiencing more difficulty were given additional follow-up activities to do in the classroom. After observing the manner in which pre-schoolers work, this writer has developed more realistic expectations for children this age. However, the length of these children's interest and attention spans was unexpected. The majority of students did not want to stop working at the end

of a half hour, and needed to be persuaded to turn their computers off. The computer software presented was apparently interesting and motivating. Opponents to computer-assisted instruction, such as Newman (1984) are wary that computers might be used as "glorified workbook exercises." The children's attitudes toward what they were doing suggested that this was not the case. After each session, a parent report was sent home to inform parents of the specific skills and computer programs their children were working on (see Appendix R). At the end of a unit, i.e. visual skills, computer literacy, an End of Unit/Individual Student Progress Report was sent home (see Appendix Q).

Recommendations

The writer has several recommendations based on the results of this practicum. Teachers should work directly from the curriculum guide introducing process areas in the sequential order presented in the guide. The particular skill should be identified, and available software should be previewed prior to actually working with students. Teachers should be thoroughly familiar with specific programs on the menu, and directions for operating those programs. This will prevent the teacher from becoming confused during

instructional time. Teachers should take great care that software and skills introduced are a meaningful and integral part of the overall classroom curriculum being taught. Children should initially sit on the floor, with software introduced in a small group lesson. Students should work on the computer in pairs. Peer teaching enhances instruction given by the teacher. Follow-up materials provided in the curriculum guide should be used to reinforce the skill taught. A parent report should be sent home after each session to inform parents of skills introduced on the computer.

Dissemination

The results of this practicum project have been shared in three ways. The teachers at the community center each have a copy of the computer-assisted reading readiness curriculum. The teachers of the four-year-olds are using the curriculum to continue implementing the program. The curriculum guide was shared with a kindergarten teacher at this writer's school, who is using it with her students. The curriculum guide was given to a parent of a four-year-old who uses it with her child on a home computer.

Consideration is being given to providing neighborhood pre-schools with the curriculum guide to supplement existing curriculum. Consideration is also being given to publishing the guide as a supplement for existing curriculum. Parents who have pre-schoolers at home could use it to become familiar with appropriate software to enhance reading readiness. The writer has been given feedback by those using the curriculum that it is useful both in schools and at home to reinforce and supplement reading readiness skills.

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Artworx, 150 North Main Street, Fairport, New York 14450

Broderbund Software, P.O. Box 3266, Eugene, Oregon 97403

Children's Computer Workshop, One Lincoln Plaza, New York, New York 10023

Counterpoint Software, Inc., Suite 140, Shelard Plaza North, Minneapolis, Minnesota 55426

DLM, One DLM Park, Allen, Texas 75002

Designware Inc., 185 Berry Street, San Francisco, California 94107

Edusoft, P.O. Box 2560, Berkeley, California 94702

Edu-Ware Services, Inc., P.O. Box 22222, Aguora, California 91301

Eric Software Publishing, 1713 Tulare, Fresno, California 93721

Hartley Courseware Inc., P.O. Box 431, Dimondale, Michigan 48821

Huntington Computing, P.O. Box 1297, Corcoran, California 93212

Ideatech, P.O. Box 62451, Sunnyvale, California 94088

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Minnesota Educational Computing Corporation (MECC), 3490 Lexington Avenue North, St. Paul, Minnesota 55126

Nova Software, P.O. Box 545, Alexandria, Minnesota 56308

PDI (Program Design Inc.), 95 East Putnam Avenue, Greenwich, Connecticut 06830

Random House, Inc., 201 East 50th Street, New York, New York 10022

Scarborough Systems, Inc., Tarrytown, New York 10591

Sierra-On-Line, Inc., P.O. Box 485, Coarsegold, California 93614

Software Entertainment Company, 541 Willamette, Eugene, Oregon 97401

Spinnaker Software Corp., 215 First Street, Cambridge, Massachusetts 02142

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APPENDIX A

INTERVIEW WITH PROGRAM COORDINATOR

NAME: _____

POSITION: _____

INSTRUCTIONS: Please respond to the following questions.

1. How long has the community center been in existence?
2. How would you describe the community center in terms of membership and programs available?
3. How many students participate in the pre-school program?
4. How many classes do you have at each age level?
5. Do you have a kindergarten program? How many students participate in that program?
6. What is your student/teacher ratio?
7. What is the level of education of your teachers?
8. What hours do students spend in the pre-school program?
9. Is reading part of the pre-school curriculum?
10. Are the students at the community center pre-school currently receiving instruction on the computer?
11. Do you feel there is a need for computer education? If so, why?
12. Are computers readily available to these students during the school day? How many computers are available?
13. Why have computers not been implemented before?
14. To your knowledge, are the pre-school teachers trained in, and comfortable using, computers to supplement their program?
15. To your knowledge, have the pre-school children participating in the community center received computer training in other after-school programs?
16. Do you feel the teachers would be interested in assistance in providing computer education to their students?
17. Do you feel parents would be interested in their children participating in a computer education program?
18. Can you provide a listing of any software you have available for use by the pre-school children?

APPENDIX B

Needs Assessment for Parents

	Yes	No
1. Is your child currently receiving computer education in his/her pre-school program?	_____	_____
2. Has your child participated in an after-school computer education program?	_____	_____
3. Are you interested in having your child obtain computer knowledge as part of the Jewish Community Center Pre-School Program?	_____	_____
4. Do you feel your child would benefit by using the computer to supplement reading taught in his/her pre-school?	_____	_____
5. Are you in favor of adding Computer Education to the Jewish Community Center Pre-School Program?	_____	_____

APPENDIX C

RESULTS OF PARENT NEEDS ASSESSMENT

Needs Assessment for Parents

The first set of answers pertains to 4- and 5-year-old children. The second set of answers pertains to 3- and 4-year-old children.

	Yes	No
1. Is your child currently receiving computer education in his/her pre-school program?	0% 0%	100% 100%
2. Has your child participated in an after-school computer education program?	10% 100%	90% 0%
3. Are you interested in having your child obtain computer knowledge as part of the Jewish Community Center Pre-School Program?	98% 80%	2% 20%
4. Do you feel your child would benefit by using the computer to supplement reading taught in his/her pre-school?	98% 60%	2% 40%
5. Are you in favor of adding Computer Education to the Jewish Community Center Pre-School Program?	98% 80%	2% 20%

APPENDIX D

Teacher Questionnaire

	Yes	No
1. Have you had any prior training in computer education?.....	_____	_____
2. Are you comfortable in using computers?.....	_____	_____
3. Are you familiar with computer software that corresponds to skills taught in the classroom?.....	_____	_____
4. Do you utilize computers to supplement your classroom instruction?.....	_____	_____
5. Do you feel pre-schoolers would benefit by acquiring basic computer knowledge?.....	_____	_____
6. Do you feel pre-reading readiness skills taught in the classroom could be reinforced on the computer?.....	_____	_____
7. Would computer instruction as outlined above be seen as a desirable and important part of your program?..	_____	_____
8. Would you be willing to participate in a computer education program to supplement reading readiness skills?.....	_____	_____

Teacher: _____ Date: _____

APPENDIX E

Results of Teacher Questionnaire

	Yes	No
1. Have you had any prior training in computer education?.....	1	9
2. Are you comfortable in using computers?.....	1	9
3. Are you familiar with computer software that corresponds to skills taught in the classroom?.....	0	10
4. Do you utilize computers to supplement your classroom instruction?.....	0	10
5. Do you feel pre-schoolers would benefit by acquiring basic computer knowledge?.....	10	0
6. Do you feel pre-reading readiness skills taught in the classroom could be reinforced on the computer?.....	10	0
7. Would computer instruction as outlined above be seen as a desirable and important part of your program?..	10	0
8. Would you be willing to participate in a computer education program to supplement reading readiness skills?.....	10	0

APPENDIX F

In-Service Computer Workshop

Community Center Pre-School Program

COMPUTER TRAINING PROGRAM AGENDA

Step I: Computer Terms and Operations

Step II: Educational Computer Applications

Step III: Courseware Evaluation

Post-Test

Participants will be able to:

1. Identify and use basic computer equipment.

2. Acquire familiarity with computer terminology.

3. Demonstrate an understanding of different applications software.

4. Demonstrate an awareness of software used in teaching reading readiness skills.

5. Become familiar with utility software to enhance a reading program.

6. Become familiar with DOS commands.

7. Demonstrate an understanding of ways to integrate computers into the regular curriculum.

8. Evaluate reading software programs.

Specific information covered:

I. Hardware

1. Computer
    a. Central Processing Unit
    b. RAM (Random Access Memory)
    c. ROM (Read Only Memory)
    d. On-Off Switch
    e. Power
2. Keyboard
    a. Caps Lock
    b. Return Key
    c. Shift Key
    d. Home
    e. CTRL Key
    f. Left arrow and right arrow key
    g. PR #6, PR #1, PR #0
3. Monitor
    On-Off Switch
4. Printer
    a. Dot Matrix Printer
    b. Letter Quality Printer
5. Disk Drive
    Floppy disks and rules

II. Educational Computer Applications

A. Applications software (courseware)

1. Simulations--programs that imitate real world experiences
2. Tutorials--assumes little or no prior knowledge of subject matter
3. Drill and Practice--reinforces previously taught concepts using a variety of repetitive tasks
4. Educational games

B. Custom Software

C. Public Domain

D. Computer-assisted Instruction (use of computers for instructional tasks)

1. Review curriculum guide
2. Hands-on experience with specific programs
3. Review DOS commands

E. Utility Software

1. "Print Shop," by Broderbund Software
2. "Bank Street Writer," by Broderbund Software
3. "File Cabinet"

III. Courseware Evaluation

Using a software evaluation form, evaluate different software according to criteria specified.

APPENDIX G

In-Service Post-Test

Check the correct response(s) as it applies to computers.

1. The main purpose of the computer is:

   ____ To replace pencils and paintbrushes.

   ____ To use the computer as another tool to enhance learning.

   ____ To be a babysitter.

2. The microprocessor is:

   ____ The part of the computer that executes or processes information.

   ____ An input device.

   ____ The storage unit.

3. RAM is:

   ____ A California football team.

   ____ The computer memory that allows you to call back information you have saved.

   ____ A woolly animal.

4. The keyboard is:

   ____ On the piano.

   ____ The part that allows us to input information into the computer.

   ____ Memory.

5. Hardware is:

____ The components of the computer.

____ A store to buy tools.

____ A dot matrix system.

6. Software is:

____ Programs that simulate real world experiences, drills, games, etc.

____ Cotton garments.

____ A peripheral to output data.

7. Software should:

____ Be easy enough for the child to read, but challenging as well.

____ Be user-unfriendly.

____ Be critical.

8. A good program to send graphic notes home to parents is:

____ Bye Bye Birdie.

____ Print Shop.

____ Kids on Keys.

9. Reading readiness skills that can be supplemented on the computer include:

____ Visual discrimination.

____ Visual memory.

____ Gross motor.

10. Which of these is not a utility software?

____ Print Shop.

____ Bank Street Writer.

____ Early Games Matchmaker.

APPENDIX H

RESULTS OF IN-SERVICE POST-TEST

Question #	% of Teachers Responding Accurately
1	100%
2	90%
3	100%
4	100%
5	100%
6	100%
7	100%
8	100%
9	80%
10	80%

APPENDIX I

SOFTWARE EVALUATION FORM

Evaluating Software With Pre-School Children

Name of Program: _____

Manufacturer: _____

Age/Grade Level: _____

Skill Tapped: _____

Circle YES or NO

1.	Is the program easy for the child to use?	Yes	No
2.	Can the child understand and follow the directions independently?	Yes	No
3.	Does the program maintain the child's interest and attention?	Yes	No
4.	Are there colorful graphics?	Yes	No
5.	Is there sound?	Yes	No
6.	Can the child have fun using this program?	Yes	No
7.	Does it work on an important skill?	Yes	No
8.	Does the child receive positive reinforcement?	Yes	No
9.	Is the print adequate in size?	Yes	No

Overall Rating: _____

1 = Poor 2 = Fair 3 = Good 4 = Excellent

APPENDIX J

WEEKLY LOG

Group _____ Week _____

Skill Introduced: Cluster _____

Lesson _____

Objective _____

Software Used: _____

_____

Follow-up Activity # _____

Successful Methods _____

_____

_____

Unsuccessful Methods _____

_____

_____

Concerns or Changes _____

_____

_____

Actions Taken as a Result of Concerns _____

_____

_____

_____

APPENDIX K

COMPUTER-ASSISTED READING READINESS PROGRAM

CURRICULUM GUIDE

Computer-Assisted Reading Readiness Program

By

Joanne Nemiroff

Contents

		Page
Part I:	Program Purpose	83
	Center Approach	85
	Class Roster	86
	Individual Progress Sheet	87
Part II:	Cluster I: Computer Literacy	89
	Objective 1	89
	Objective 2	90
	Objective 3	92
	Objective 4	93
	Objective 5	94
	Objective 6	95
	Objective 7	96
	Objective 8	97
Part III:	Cluster II: Visual Skills	98
	Lesson 1: Visual Discrimination	98
	Lesson 2: Visual Closure	100
	Lesson 3: Visual Memory	103
	Lesson 4: Visual Sequencing	107
	Lesson 5: Letter Recognition	110
	Lesson 6: Letter Matching	112

		Page
	Lesson 7: Letter Sequencing.....	114
	Lesson 8: Letter Recall.....	115
	Lesson 9: Eye-Hand Coordination.....	116
Part IV:	Cluster III: Conceptual Development.....	117
	Lesson 1: Vocabulary Formation.....	117
	Lesson 2: Classifying/Categorizing.....	121
Part V:	Cluster IV: Reading Skills.....	122
	Objective 1: Color Words.....	122
	Objective 2: Number Words.....	123
	Objective 3: Beginnin Sounds.....	124
	Objective 4: Picture/Word Association...	125
	Objective 5: Words in Contest.....	126
References.....		127
Follow-up Materials.....		130

Program Purpose

The Computer-Assisted Reading Readiness Program is designed to promote learning of developmental skills important in reading. Skills are initially introduced to acquaint the child with specific hardware and software, and increase his interest in using the computer. Computer reading readiness skills emphasized include:

1. Visual discrimination and attention to detail.
2. Retention and sequencing of visually presented stimuli.
3. Development of concepts such as left-to-right and top-to-bottom.
4. Eye-hand coordination.
5. Awareness and understanding of letters and the sounds they produce.
6. Vocabulary development.
7. The ability to associate words with pictures.
8. Understanding words in context.

The program is designed to promote a diagnostic, individualized approach to reading readiness.

Organization of Lessons and Instructional Methods

Pre-readiness skills are taught in the classroom by the teacher utilizing the curriculum established by his/her school. The computer-assisted reading curriculum serves to supplement classroom instruction using computer software.

Follow-up activities, consisting of worksheets, games, art, and movement activities, etc., are suggested to enhance skills taught. Follow-up materials can serve to assess a child's understanding of a particular skill. Many follow-up materials are provided; however, several activities will need to be made by the teacher.

Level of Materials

Materials are presented on a pre-reading level appropriate for nursery school and kindergarten classes.

Criteria for Success

Follow-up worksheets, as well as informal teacher evaluation, should be used to measure success. A child should progress to the next readiness skill when he successfully masters a minimum of 90% accuracy on materials presented.

NOTE: Software listed is based on materials available at the pre-school implementing this curriculum. Additional software, as available, should be categorized and utilized.

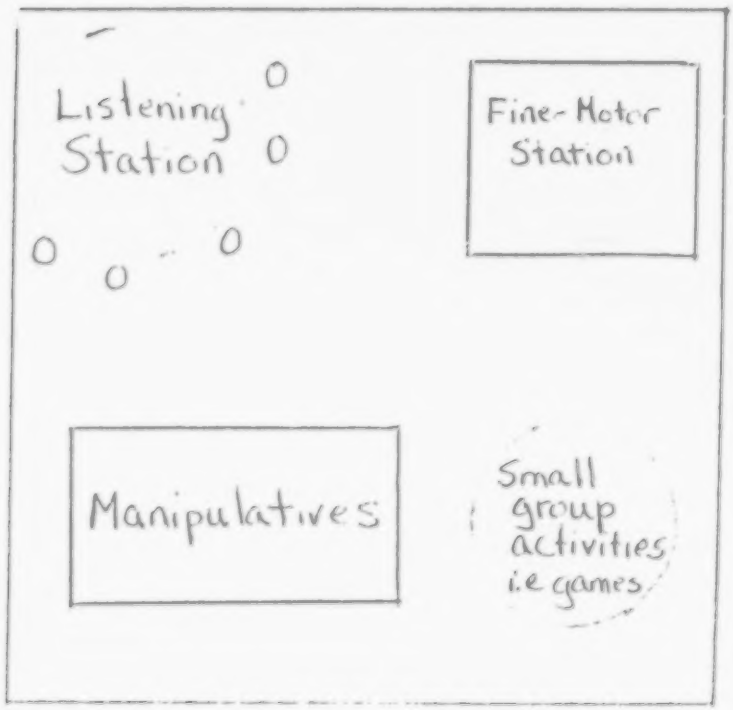
Center Approach to Computer Learning

1. Group lesson initially taught by the teacher in the classroom.

2. Activity presented on the computer utilizing specific software geared to reinforce the specific skill previously taught.

3. Follow-up activities to supplement learning of that skill can be presented at various centers utilizing a variety of techniques (i.e., auditory learning, manipulatives, fine-motor skills, games approach).

Stations might include:



STUDENTS' NEEDS IN READING READINESS

(CLASS ROSTER)

NAME OF STUDENT	Computer Literacy	Visual Discrimination	Visual Closure	Visual Memory	Visual Sequencing	Letter Recognition	Letter Matching	Letter Sequencing	Letter Recall	Eye-Hand Coordination	Vocabulary Formation	Classifying/ Categorizing	Word Recognition Color Words	Word Recognition Number Words	Beginning Sounds	Picture/Word Association	Words in Context	

Individual Student Progress Sheet

Student's Name _____

Area Working On	Date Computer Used	Specific Software Used
Computer Literacy		
Visual Discrimination		
Visual Closure		
Visual Memory		
Visual Sequencing		
Letter Recognition		
Letter Matching		
Letter Sequencing		
Eye/Hand Coordination		

Student's Name _____

Area Working On	Date Computer Used	Specific Software Used
Vocabulary Formation	_____	_____
Classifying/Categorizing	_____	_____
Word Recognition (Color Words)	_____	_____
Word Recognition (Number Words)	_____	_____
Beginning Sounds	_____	_____
Picture/Word Association	_____	_____
Words in Context	_____	_____

Cluster I: Computer Literacy

Objective 1

By utilizing a prepared program, the student will develop a positive attitude about the computer, seeing it as a source of enjoyment.

Procedure

Demonstrate several simple programs which the children will view as stimulating, illustrating different uses of the computer (i.e., games, educational).

Recommended Software

1. "Stickybear Bop" by Xerox Education Publications Weekly Reader.

2. "Early Games" by Counterpoint Software.

Follow-up Activity

Read Scooter Computer & Mr. Chips, The Computer In The Candy Store by Leslie McGuire. Discuss the role of computers, and have children illustrate their favorite part.

Objective 2

The student will be able to name the different parts of the computer (i.e., monitor, keyboard, disk drive, printer).

Procedure

Demonstrate the use of each part of the computer. As you do, place a picture and the label of the part on a chartboard.

Follow-up Activities

1. Have children locate specific parts of the computer and color them the colors indicated by the teacher (see attached sheet).

2. Using the sheet illustrating the computer parts (see attached sheet), have students do the following:

   a. Put a blue X on the monitor.

   b. Put a red 0 on the disk drive.

   c. Put a yellow 0 on the disk drive.

   d. Put a green X on the floppy disk.

3. Build your own computer. Using an egg carton for the keyboard, a large cereal box for the computer, and a laundry box for the monitor, build your own computer. Cover each part with construction paper.

4. Have the children cut out the parts of the computer (see attached sheet). Give them another paper divided into five boxes. Make up riddles describing a computer part and

have them paste that part in a box (i.e., "I am the part of the computer that you type on to give me information. What am I?").

5. Glue the parts of the computer (see attached sheet) onto heavy construction paper. Cut the parts into pieces and have the children put the puzzle pieces together.

Objective 3

The student will develop an understanding of the rules associated with the hardware and software of the computer.

Procedure

1. Review with the children the following rules, illustrating the rules on a chart.

   a. Do not bend the diskette.

   b. Do not touch the brown or gray magnetic disk through the oblong holes.

   c. Insert and remove the disk carefully from the drive.

   d. Put the disk back in the envelope when you are finished.

   e. Do not bring food or drinks near the computes.

   f. Do not open the disk drive door when the red light is on.

Follow-up Activity

Have children draw pictures to illustrate the care of the diskette.

Objective 4

The student will be able to turn on the computer, load a disk in the disk drive ("boot a disk"), and remove the disk from the disk drive.

Procedure

Using the children to role-play, give them step-by-step instructions to load a disk. Refer to a master chart that the children could use as a guide. Steps would include:

1. Take the disk out of its paper jacket. Hold it by putting your thumb over the label and pointer finger under.
2. Put the disk into the slot in drive 1.
3. Close the door on the disk drive.
4. Turn on the computer.
5. Wait for the program to load.
6. When the program selections come on the screen, press the number you want and press the RETURN key.
7. Play the game.
8. When finished, take the disk out of the disk drive.
9. Put the disk back in the envelope.

Follow-up Activity

Use commercial materials, such as Minnesota Educational Computing Corporation worksheets, to reinforce the concept of loading a disk.

Objective 5

The student will be able to locate specific letters on the keyboard.

Recommended Software

1. "The Friendly Computer," by Minnesota Educational Computing Corporation. Specific program on menu: #1. "Keyboard Drill."

2. "Alphabet Circus," by DLM. Specific program on menu: "Juggler."

3. "Kids on Keys," by Spinnaker.

Additional Software

"Micro Mother Goose," by Software Productions.

Follow-up Activities

1. Hold up a flashcard that has a letter, number, or symbol on it. Have the children press the matching symbol on the keyboard.

2. Give each child a copy of the Apple IIe keyboard (see attached sheet). Then give each child ten small pieces of paper with a symbol on each. The first child to match the symbols with the letters on the model keyboard wins.

3. Using the copy of the Apple IIe keyboard (see attached sheet), have students locate and color specific keys. Have them spell out and color their names blue, their phone number red, etc.

4. Workbooks, such as Computergarten by Scholastic Books, can be used to reinforce keyboard skills.

5. Games, such as Keyboard-on-the-Floor, by Scholastic Books, is a fun way to learn the keyboard.

Objective 6

The child will demonstrate an understanding of the following keys on the keyboard: Spacebar, Return, Escape, Control, Shift.

Procedure

1. Using "Bank Street Writer," demonstrate the result of using each of these keys.

2. Under teacher direction, have each child use the keys to see what occurs.

3. Children can type without a disk in the disk drive, by pressing CONTROL-RESET to stop the drive.

Recommended Software

"Bank Street Writer," by Broderbund Software.

Follow-up Activity

Using the mimeographed sheet of the computer keyboard (see attached sheet), have children follow directions such as:

1. Color the RETURN key yellow.
2. Color the SPACEBAR key orange.
3. Color the SHIFT keys green.
4. Color the ESCAPE key black.
5. Color the BACKSPACE key red.

Objective 7

The student will be able to type and print out their name using the keyboard, software package ("Bank Street Writer") and printer.

Recommended Software

1. "Bank Street Writer," by Broderbund Software.
2. "Early Games," by Counterpoint Software.

Follow-up Activity

Have students type and print out their name. Using computer magazines, have them make a collage by cutting and pasting pictures related to computers around their name.

Objective 8

The student will design a sign for their room, "_____ Room" utilizing the Print Shop program, choosing a border, font, graphic, and typing out their name.

Recommended Software

"Print Shop," by Broderbund Software.

Follow-up Activity

Have children color the letters with markers and hang signs in their room.

Cluster II: Visual Skills

Lesson 1: Visual Discrimination

The ability to recognize similarities among geometric forms, letters, and/or words.

Objective 1

The student will discriminate gross differences between objects, geometric figures, letters, or words.

Recommended Software

1. "Early Games Matchmaker," by Counterpoint Software.
2. "Shape and Color Rodeo," by DLM. Specific programs on menu: "Rodeo Flags" and "Cowhand Brand."
3. "Make a Match," by Springboard.
4. "Reader Rabbit and the Fabulous Word Factory," by The Learning Company.
5. "Fuzzywomp," by Sierra-on-Line. Specific program on disk: "Domino Match."
6. "Electronic Playground," by Software Entertainment Company.
7. "The Learning Line," by Eric Software Publishing.
8. "Dinosaurs," by Advanced Ideas.
9. "Pre-school IQ Builder I," by PDI.
10. "Pre-school IQ Builder II," by PDI.
11. "Moptown Parade," by The Learning Company. Specific programs on menu: "Who's Different" and "What's the Same."

12. "Kindercomp," by Spinnaker. Specific program on disk: "Match."

13. "Fun From A to Z," by MECC. Specific program on disk: "Birds."

Follow-up Activity

Have students complete worksheets emphasizing visual discrimination skills (see attached sheets).

Lesson 2: Visual Closure

The ability to recognize the whole from its parts.

Objective 1

The child will be able to locate objects hidden within a picture.

Recommended Software

1. "Ernie's Quiz," by Children's Computer Workshop.
2. "Shape and Color Rodeo," by DLM. Specific program on menu: "Shape Roundup."
3. "Stickybear Shapes," by Xerox Weekly Reader Series.
4. "Instant Zoo," by Children's Television Workshop.

Follow-up Activities

1. Do worksheets in which the child must draw objects to complete a design (see attached sheet).
2. Have the children locate objects hidden in pictures, and color them. Materials such as Look & See from The Golden Readiness Series can be used.

Objective 2

The child will display a knowledge of body parts.

Recommended Software

1. "Facemaker," by Spinnaker.

2. "Creature Creator," by Designware.

Follow-up Activities

1. Have children trace their body image on large brown paper. Have them fill in the eyes, nose, mouth, etc.

2. Sing songs such as "Head, Shoulders, Knees, and Toes," and have children do the actions. Variation--use different body parts and increase the number used as the ability of the children increases.

Objective 3

The child will perceptually re-create a block design.

Recommended Software

1. "Perceptual Design I" (self-made disk).
2. "Gertrude's Secrets," by The Learning Company.
3. "Gertrude's Puzzles," by The Learning Company.

Follow-up Activity

Give the child worksheets to copy patterns (see attached sheet).

Lesson 3: Visual Memory

The ability to recall accurately prior visual experiences.

Objective 1

The student will be able to learn basic geometric shapes.

Recommended Software

1. "Stickybear Shapes," by Xerox Educational Publications Weekly Reader.

2. "Children's Carousel," by Dynacomp.

Follow-up Activities

1. Give each child a set of cards, each card possessing a different geometric shape. Prepare four flashcards, one with a square, one with a circle, one with a triangle, and one with a diamond. Flash each for the count of 1001, 1002, 1003. Then direct the learner to hold up the card which illustrates the one shown.

2. Place symbol cards on the seats of chairs arranged in a large circle. The learners march around the chairs in time to the music, until the music stops. Then each must name the symbol on the seat of the chair next to where he or she stopped.

3. To enhance visual memory of objects, use DLM Visual Memory Cards II. Display a card with objects on it, and have the child re-create the sequence of objects.

4. Using beads of different colors and shapes, construct a chain which the child views for a few seconds, remove, and then have him arrange the beads in the same sequence. This can also be done with felt shapes on a flannel board.

Objective 2

The student will be able to recognize and re-create his name.

Recommended Software

1. "Early Games," by Counterpoint Software.

2. "Kindercomp," by Spinnaker. Specific program on disk: "Names."

Follow-up Activities

1. Give the learner a card with his or her name printed on it. Tell him or her to point to the word printed on the card and to tell you what it says.

2. Using tracing paper, have the child trace his name.

Objective 3

The child will be able to reproduce correctly a sequence of actions from memory.

Recommended Software

1. "Facemaker," by Spinnaker.

2. "Creature Creator," by Designware.

Follow-up Activities

1. Play Simon Sez, demonstrating two motions for the children to repeat. Gradually increase the number of movements.

2. Give a child two directions to follow. Gradually increase the number of instructions (i.e., put the pencil in the book, clap your hands three times, and then open the door).

Lesson 4: Visual Sequencing

The ability to perceptually order objects in proper sequence.

Objective 1

The child will become familiar with the concepts first and last, and be able to sequence letters in the alphabet.

Recommended Software

1. "Alphabet Circus," by DLM. Specific programs on menu: "Alphabet Parade" and "Secret Letter."

2. "Getting Ready to Read and Add," by Sunburst. Specific program on menu: Drill on upper and lower case alphabet.

3. "Easy as ABC," by Springboard. Specific program on menu: "Dot to Dot."

4. "Moptown Parade," by The Learning Company. Specific program on menu: "Who Comes Next?"

5. "Kindercomp," by Spinnaker. Specific program on menu: "Names and Sequence."

6. "Fun From A to Z," by MECC. Specific programs on menu: "Dots" and "Runners."

Follow-up Activities

1. Direct the child to point to the first letter and to the last letter on a card containing his name.

2. Give the child cards with his name (1 letter per card) scrambled, and ask him to put them back in the right order.

3. Use puzzles in which a learner must trace a pattern following numbers or letters.

4. Have the child color patterns on worksheets (see attached sheet).

Objective 2

The child will become familiar with direction, learning concepts such as top, bottom, left, and right.

Recommended Software

"Juggles' Rainbow," by The Learning Company.

Follow-up Activities

1. Place a red ribbon on the child's right hand and right foot. Give him directions such as, "Simon says touch the floor with your right hand."

2. Give children ditto of hands (see attached sheet). Give directions such as, "Put a ring on the number 4 finger on the right hand;" "Put an X on the left thumb;" etc.

Lesson 5: Letter Recognition

Objective 1

The student will be able to recognize the letters of the alphabet.

Recommended Software

1. "Charlie Brown ABC," by Random House.
2. "Alphabet Circus," by DLM. Specific program on menu: "Meet the Circus."
3. "Stickybear ABC," by Xerox Weekly Reader Series.
4. "The Talking Alphabet," by Nova Software.
5. "Easy as ABC," by Springboard.
6. "Early Games for Young Children," by Counterpoint.

Additional Software

1. "Teacher's Pet," by Artworx.
2. "Hodge Podge," by Artworx.
3. "Alphabet Song," by Edusoft.
4. "Letter Recognition," by Hartley.

Follow-up Activities

1. Make a pocket chart and provide the learners with symbol cards. Hold up a card (such as letter A) and say, "This is the letter A. If you have a letter A, come place it in the same pocket where I put mine, and say the letter's name as you do so."
2. Provide manipulatives such as clay, pipecleaners, and sand in which the child can make letters.

3. Give the child sandpaper letters. Have him feel the letter, and re-create it on a sheet of paper.

4. A heavy piece of cardboard can be used to have students string matching upper and lower case letters together.

5. Children can make letters with their bodies and have other students guess the letters made.

Lesson 6: Letter Matching

Objective 1

The student will be able to match the letters of the alphabet.

Recommended Software

1. "Early Games Matchmaker," by Counterpoint Software.

2. "Alphabet Circus," by DLM. Specific program on menu: "Juggler."

3. "Kindercomp," by Spinnaker. Specific program on menu: "Letters."

4. "Easy as ABC," by Springboard. Specific program on menu: "Match Letters."

5. "Letter Games," by Island Cybernetics.

Follow-up Activities

1. Have the children complete worksheets such as the one attached (see attached sheet).

2. Using two sets of matching cards, have the children play CONCENTRATION looking for matching pairs of letters.

Objective 2

The student will be able to match upper-case letters with its lower-case counterpart.

Recommended Software

1. "Easy as ABC," by Springboard. Specific program on menu: "Honey Hunt."

2. "Fun from A to Z," by MECC.

3. "Muppet Word Bank," by Sunburst Communications.

Follow-up Activities

1. Provide the child with a portable typewriter. Give him a card with a small letter A, and tell him to type the capital letter. Continue throughout the alphabet.

2. Play a bingo game in which the teacher holds up a capital letter card, and the child must put an X on the matching small letter on his card.

Lesson 7: Letter Sequencing

Objective

The student will be able to determine the proper alphabetical sequence of letters presented.

Recommended Software

1. "Easy as ABC," by Springboard. Specific program on menu: "Dot to Dot," "Leap Frog," "Lunar Letters."

2. "Alphabet Circus," by DLM.

Follow-up Activity

Play a bingo game in which students place markers on the letters called in a specific sequence.

Lesson 8: Letter Recall

Objective

The student will be able to recall the letters of the alphabet after they have been shown for a period of time, and then taken away.

Recommended Software

"Apple Sprint," by Micro-Sparc, Inc.

Follow-up Activity

Show the class a card with two letters on it. After 10 seconds, take the card away. Ask the children what letters they saw. Gradually increase the number of letters shown.

Lesson 9: Eye-hand Coordination

Objective

The child will develop an awareness of left-to-right directionality, as well as coordinate his fine motor skills to complete the task desired.

Recommended Software

1. "Peanuts Maze Marathon," by Randon House.
2. "Kindercomp," by Spinnaker. Specific program on menu: "Draw and Scribble."
3. "Fuzzywomp," by Sierra-on-Line. Specific program on menu: "Make-a-Monster."
4. "Child's Play," by Huntington Computing.
5. "The Learning Line," by Eric Software Publishing.
6. "Stickybear Town Builder," by Xerox Weekly Family Software.

Follow-up Activities

1. Have the child complete simple mazes (see attached sheets).
2. Do finger plays such as "The Eensy-Weensy Spider."

Cluster III: Conceptual Development

Lesson 1: Vocabulary Formation

Objective 1: Size and Quantity Concepts

The student will be able to differentiate between the following concepts:

1. Big/little.
2. Thin/wide.
3. Most/least.
4. Full/empty.
5. Tall/short.

Recommended Software

1. "Early Games Matchmaker," by Counterpoint Software.
2. "Child's Play," by Huntington Computing.
3. "Comparison Kitchen," by DLM.

Follow-up Activity

Have the children cut out pictures from magazines or draw pictures illustrating the concepts discussed.

Objective 2: Shape Concepts

The student will be able to recognize, differentiate, and/or match squares, circles, triangles, rectangles, diamonds.

Recommended Software

1. "Stickeybear Shapes," by Xerox Weekly Reader Family Software.

2. "Early Games Matchmaker," by Counterpoint Software.

3. "Early Discoveries: Colors and Shapes," by Hartley.

4. "Early Discoveries: Patterns and Sequence," by Hartley.

5. "Muppetville," by Sunburst Communications.

Follow-up Activity

Make games such as Dominoes in which children have to match shapes that are the same color (see accompanying sheet).

Objective 3: Position and Direction Concepts

The student will be familiar with terms such as: Above, middle, under, near, front, behind, between, and beneath.

Recommended Software

1. "Puss-in-Boots," by Island Software.

2. "Stickybear Opposites," by Xerox Weekly Reader Family Software.

Follow-up Activity

Give children small dolls and ask them to place them above, under, in front of, etc., objects indicated.

Objective 4: Expressive Language

The child's expressive language will be enhanced by having him tell the teacher a story while the teacher types and prints it on the computer.

Recommended Software

1. "Bank Street Writer," by Broderbund Software.
2. "Apple Works," by Apple Concepts, Inc.
3. "Build a Book About You," by Scarbourgh Systems.

Follow-up Activities

1. Create experience charts with the students having them tell stories, and then illustrate them.
2. Tell a part of a simple story, and have the children complete the ending.
3. Give children hand puppets and have them retell a story.
4. Have the children make a picture of their favorite animal and tell about it.
5. Do a cooking activity in class and have the children make an experience chart about the cooking event.
6. Give children toy phones and have them pretend they are having a phone conversation.

Lesson 2: Classifying/Categorizing

Objective 1: Same-different Concept

The student will be able to determine if objects are the same or different.

Objective 2

The student will be able to classify objects into a group according to similarities.

Recommended Software

1. "Dinosaurs," by Advanced Ideas.
2. "Early Games Matchmaker," by Counterpoint Software.
3. "Gertrude's Secrets," by The Learning Company.

Follow-up Activities

1. Present two words to the children and have them indicate their relationship, i.e., dog-car (animals), piano-guitar (instruments), hammer-saw (tools), chicken-cow (live on a farm).

2. Make a chart with specific categories, i.e. people, animals, instruments, foods, etc. Have children cut pictures from magazines and paste them in the column they categorically belong.

3. Give students a set of shapes in various colors and sizes. Have them sort according to shape, size, or color.

Cluster IV: Reading Skills

Objective 1

Using a color monitor, the student will recognize color words, i.e., green, blue, red, etc.

Recommended Software

1. "Color Guess," by Ideatech.
2. "Early Words," by Merry Bee.

Follow-up Activities

1. Make different cards with which children can play color Bingo. The name of the color is held up while the teacher indicates the shape. Children put a mark on the color and shape called until one child gets Bingo (see attached card).

2. Games, such as the version of Color Word Trail can be played (see attached game).

Objective 2

The student will recognize number words.

Recommended Software

"Early Words," by Merry Bee.

Follow-up Activity

Give children a set of number cards which they can use to match and play Go Fish (see number cards).

Objective 3

The student will be able to identify the beginning sounds of words presented.

Recommended Software

1. "Getting Ready to Read and Add," by Minnesota Educational Computing Corporation. Specific program on menu: "A Is For Apple."

2. "Alphabet Circus," by DLM. Specific program on menu: "Lost Letter."

3. "Alphabet Zoo," by Spinnaker.

4. "First Letter Fun," by MECC.

5. "Phonics Prime Time: Initial Consonants," by MECC.

Follow-up Activities

1. Place a group of picture cards on the table. Learners take turns matching pairs of pictures that begin with the same sound.

2. Bingo can be played reinforcing the learning of beginning sounds.

3. Tagboard chart games can be played in which a letter is placed on one side and a picture beginning with the letter must be placed next to it.

4. Describing games can be played in which the teacher or child describes something in the room, telling the other students the initial sound of the object.

Objective 4

The student will be given a word and will determine which of three pictures illustrates that word.

Recommended Software

1. "Spelling Bee With Reading Primer," by Edu-Ware.
2. "Phonics Prime Time: Initial Consonants," by MECC.

Follow-up Activity

Make matching puzzle pieces in which one side is a picture and the other is a simple word that names the picture. The child must match the pieces correctly to name the picture.

Objective 5

When given a sentence with a word missing, the child will identify the missing word to complete the sentence.

Recommended Software

"Stickybear Reading," by Xerox Education Publications. Specific program on menu: "Find The Word."

Follow-up Activities

1. Sing a song with children making up the lyrics and having them fill in words that would make sense.

2. Give children three cards each with a simple sentence. Two of the cards will have an incorrect word making the sentence meaningless. The child must deterime which sentence is correct.

References

Software for activities that reinforce reading skills came from the following companies:

Advanced Ideas, 2902 San Pablo Avenue, Berkeley, California 94702

Apple Computer, Inc., 10260 Bandley Drive, Cupertino, California 95014

Artworx, 150 North Main Street, Fairport, New York 14450

Broderbund Software, P.O. Box 3266, Eugene, Oregon 97403

Children's Computer Workshop, One Lincoln Plaza, New York, New York 10023

Counterpoint Software, Inc., Suite 140, Shelard Plaza North, Minneapolis, Minnesota 55426

DLM, One DLM Park, Allen, Texas 75002

Designware Inc., 185 Berry Street, San Francisco, California 94107

Dynacomp Inc., 1427 Monroe Avenue, Rochester, New York 14618

Edusoft, P.O. Box 2560, Berkeley, California 94702

Edu-Ware Services, Inc., P.O. Box 22222, Aguora, California 91301

Eric Software Publishing, 1713 Tulare, Fresno, California 93721

Hartley Courseware Inc., P.O. Box 431, Dimondale, Michigan 48821

Huntington Computing, P.O. Box 1297, Corcoran, California 93212

Ideatech, P.O. Box 62451, Sunnyvale, California 94088

Island Cybernetics, P.O. Box 208, Port Arkansas, Texas 78373

Merry Bee, 815 Crest Drive, Omaha, Nebraska 68046

Micro-Sparc Systems, P.O. Box 325, Lincoln, Massachusetts 01773

Minnesota Educational Computing Corporation (MECC), 3490 Lexington Avenue North, St. Paul, Minnesota 55126

Nova Software, P.O. Box 545, Alexandria, Minnesota 56308

PDI (Program Design Inc.), 95 East Putnam Avenue, Greenwich, Connecticut 06830

Random House, Inc., 201 East 50th Street, New York, New York 10022

Scarborough Systems, Inc., Tarrytown, New York 10591

Sierra-On-Line, Inc., P.O. Box 485, Coarsegold, California 93614

Software Entertainment Company, 541 Willamette, Eugene, Oregon 97401

Spinnaker Software Corp., 215 First Street, Cambridge, Massachusetts 02142

Springboard Software, Inc., 7808 Creekridge Circle, Minneapolis, Minnesota 55435

Sunburst Communications, 39 Washington Avenue, Pleasantville, New York 10570-9971

The Learning Company, 545 Middlefield Road, Suite 170, Menlo Park, California 94025

Xerox Education Publications/Weekly Reader, 245 Long Hill Road, Middletown, Connecticut 06457

Games, books, ideas, etc., for Follow-up Activities were from the following sources:

Boegehold, B.D. (1984). Getting Ready to Read. New York: Ballantine Books.

Computergarten Workbooks. New York: Scholastic Books, Inc.

DLM, One DLM Park, Allen, Texas 75002

Duffy, G.G., and Sherman, G.B. (1977). Systematic Reading Instruction. New York: Harper and Row.

Florida Diagnostic and Resource Center--Media Center, Public Domain Materials, Miami, Florida.

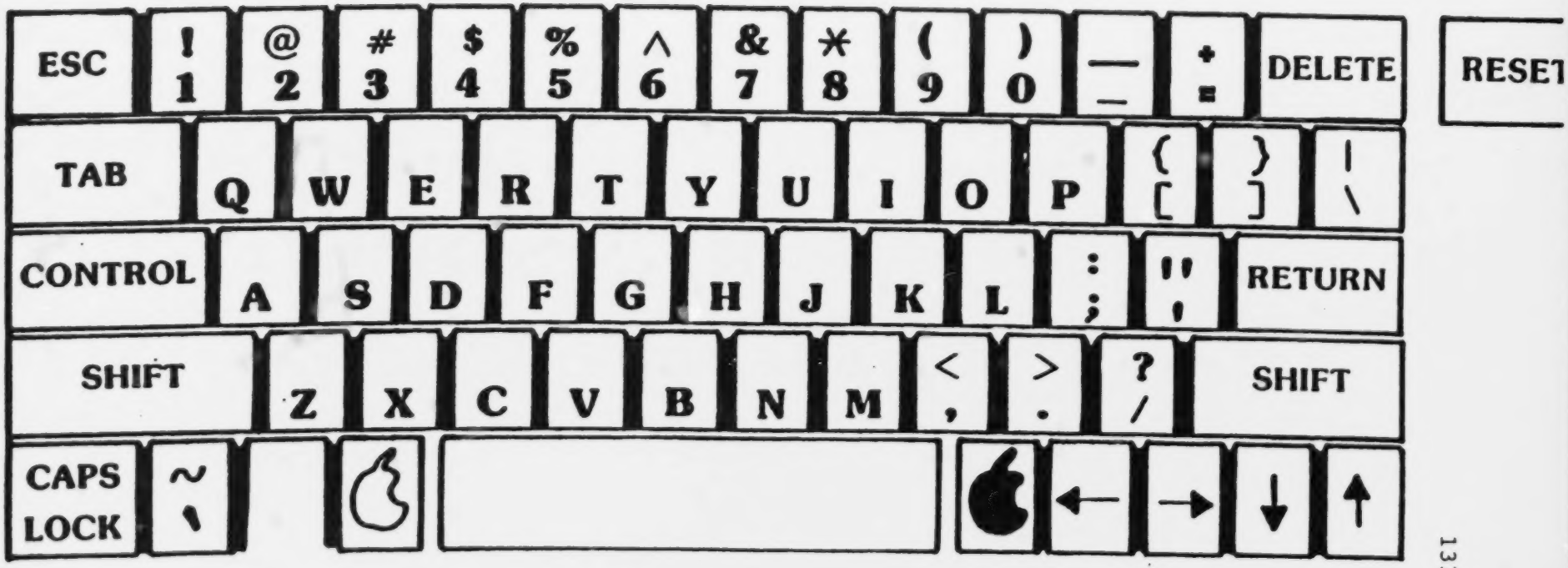
Golden Readiness Workbook Series. Racine, Wisconsin: Western Publishing Company, Inc.

McGuire, L. (1984). Scooter Computer & Mr. Chips: The Computer in the Candy Store. Racine, Wisconsin: Western Publishing Company, Inc.

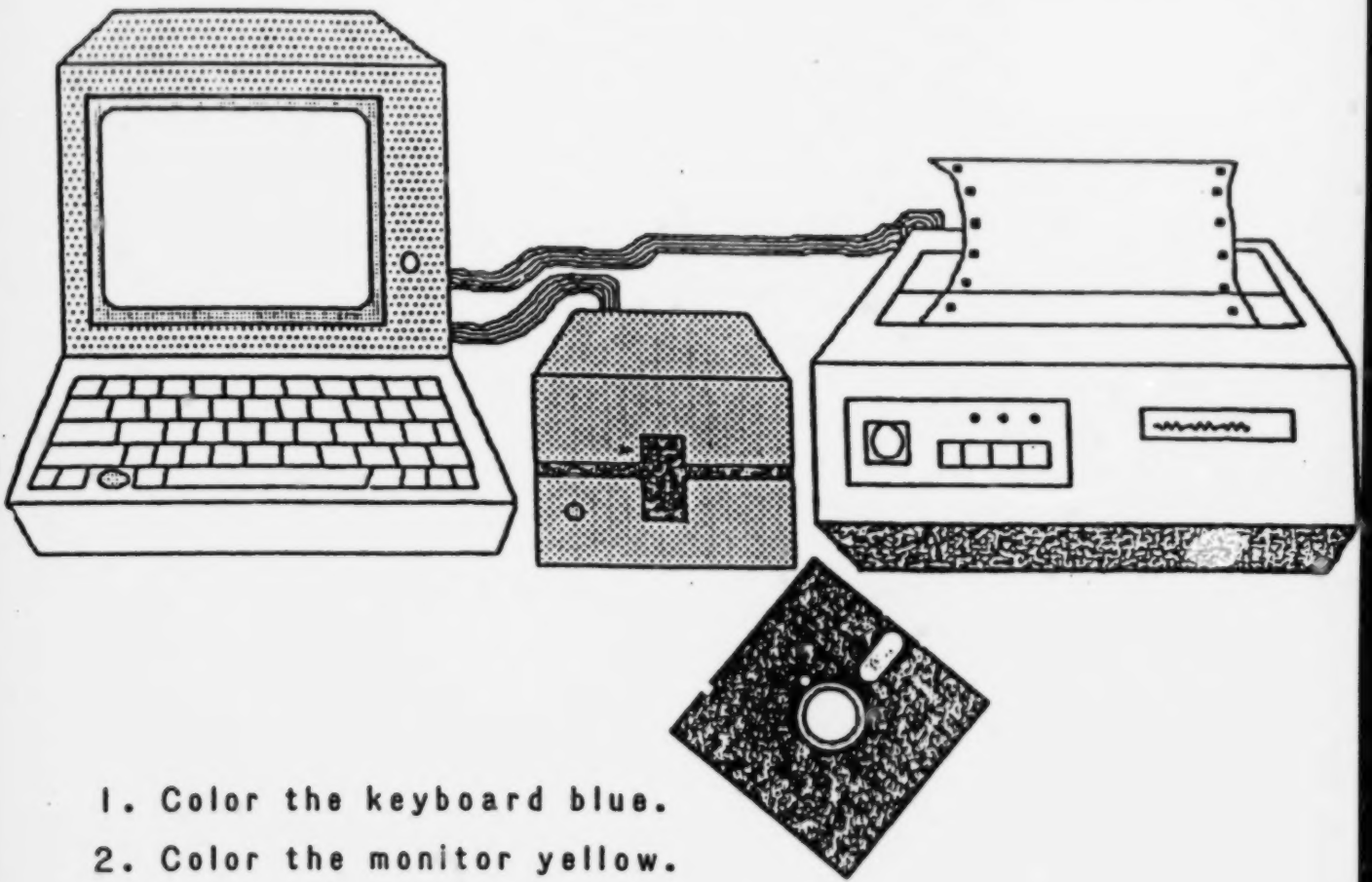
Reading Comprehension-Sequencing. San Jose, California: Enrich Div./Ohaus Instructional Materials.

Stick Out Your Neck Workbook Series. Akron, Ohio: Carson-Dellosa Publishing Company, Inc.

APPLE IIe KEYBOARD



Color the computer parts.



1. Color the keyboard blue.
2. Color the monitor yellow.
3. Color the monitor screen red.
4. Color the disk drive orange.
5. Color the disk black.
6. Color the printer green.

Visual Discrimination

Lesson 1 - Objective 1

Follow-up Activity

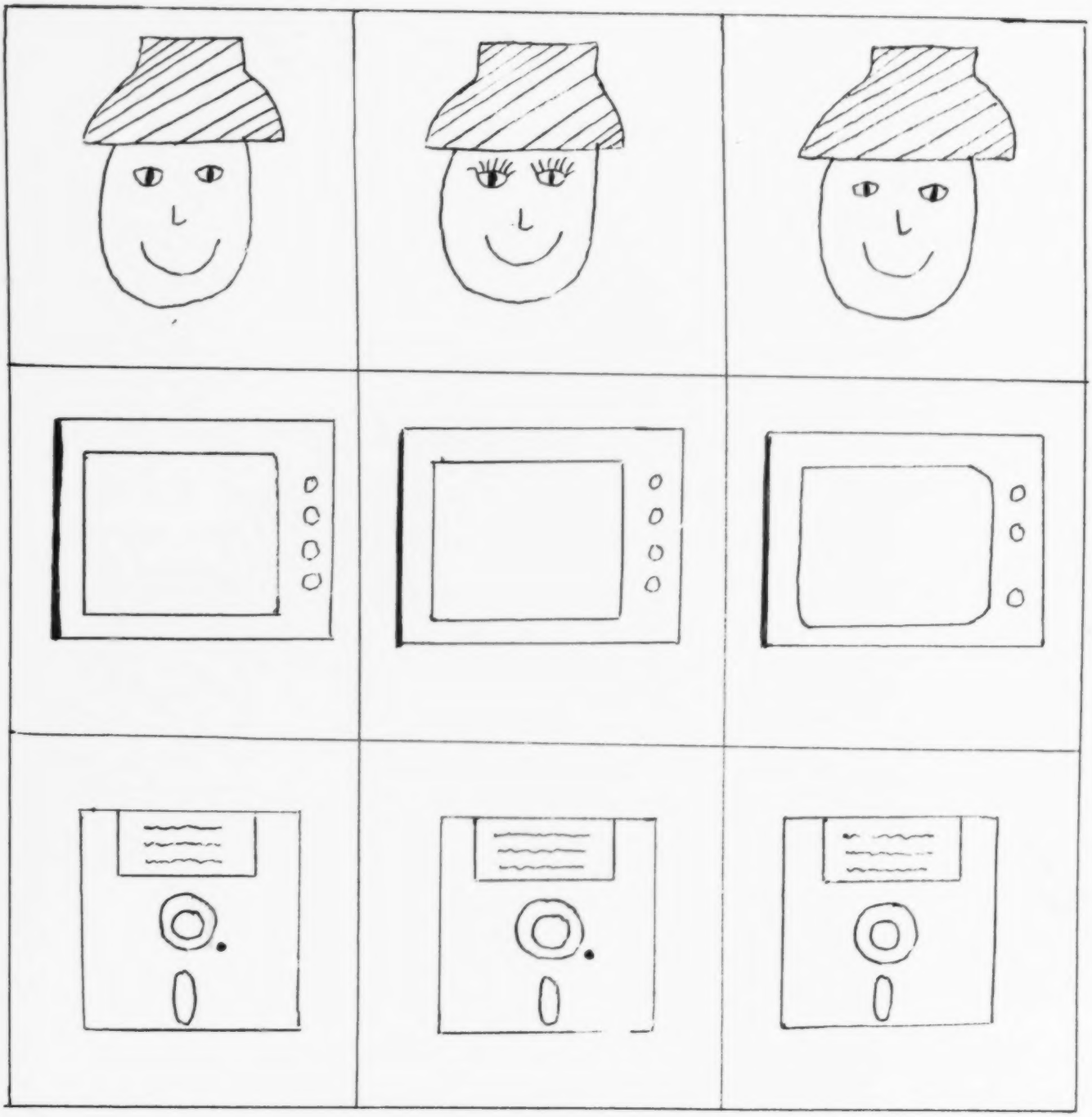
Mark the letter that is different in each set.

SET I:	g	g	w	g
SET II:	s	a	a	a
SET III:	e	y	e	e
SET IV:	m	m	m	l
SET V:	b	v	b	b
SET VI:	x	x	x	c
SET VII:	d	r	d	d
SET VIII:	o	o	j	o
SET IX:	z	z	z	x
SET X:	s	s	S	s

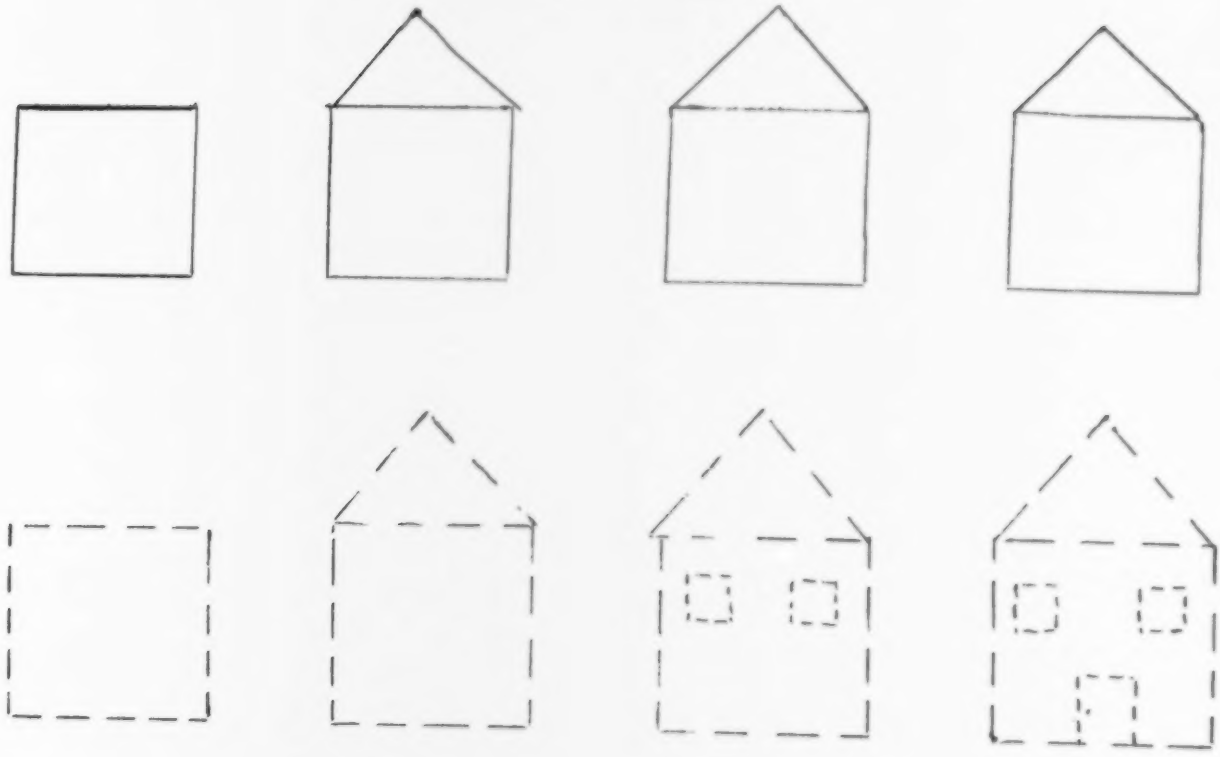
Visual Discrimination

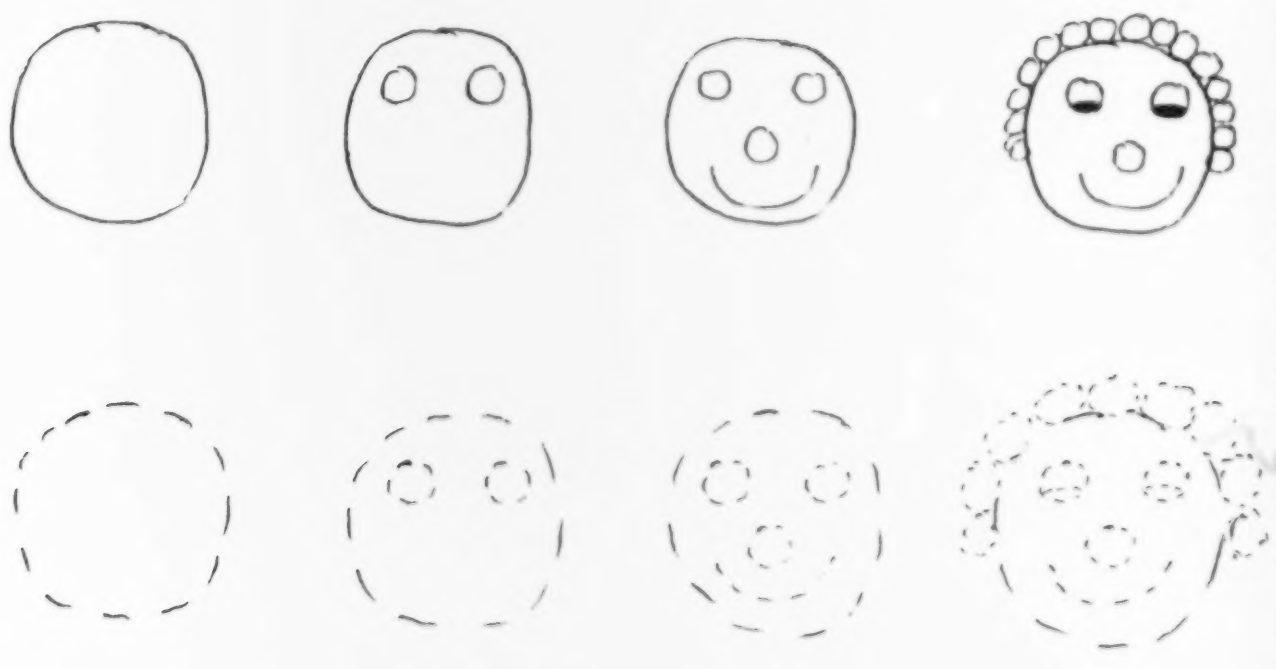
Lesson 1 - Objective 1

Circle the pictures in each row that look the same. Color the pictures.



Visual Closure
Lesson 2 - Objective 1





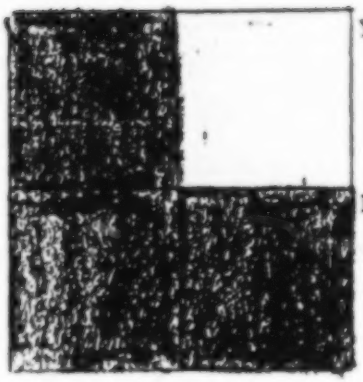
Visual Closure

Lesson 2 - Objective 3

Example

Red Yellow

1.

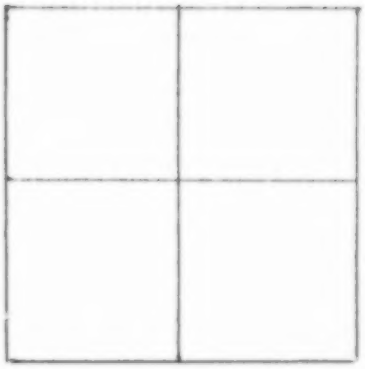


Orange Purple

Child's Copy

1.

2.



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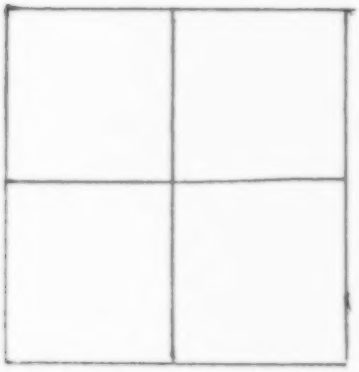

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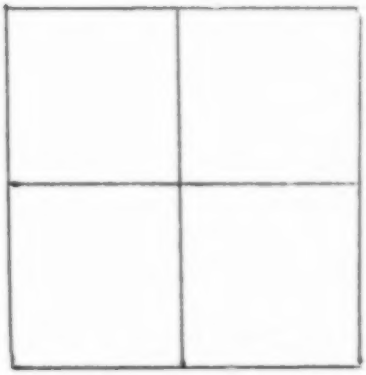

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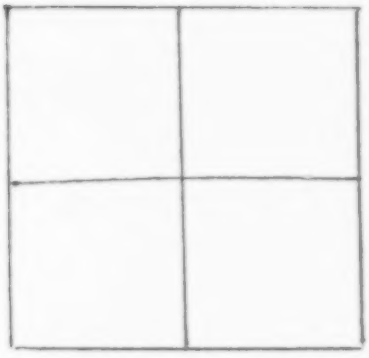


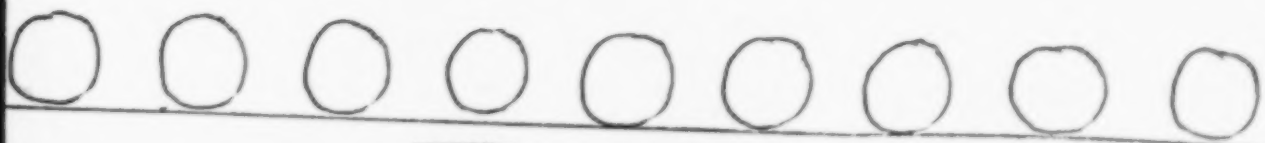
Visual Sequencing

Lesson 4 - Objective 1

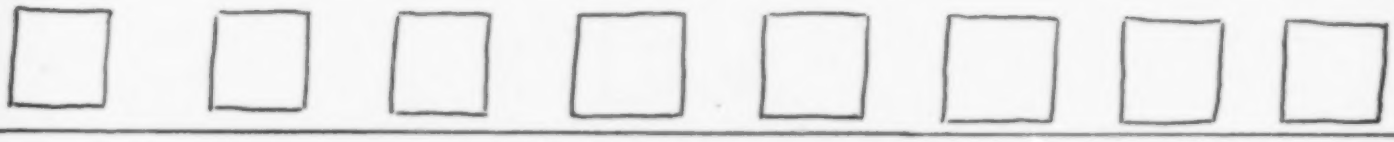
Color each row of shapes in the same order of colors shown above the row.

Red Yellow

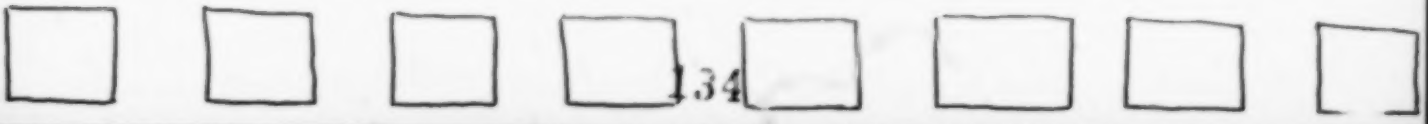
Purple Orange Yellow



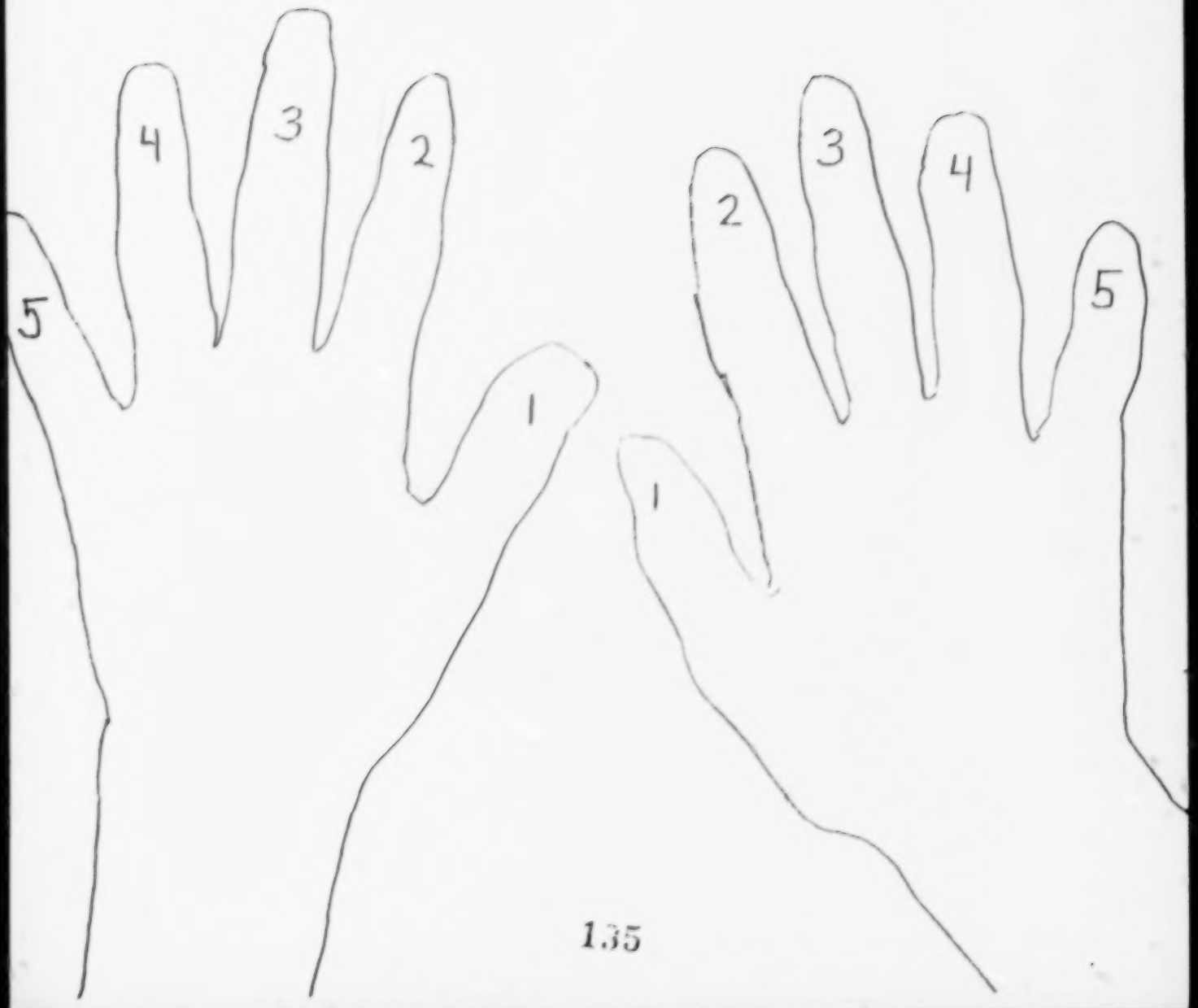
Orange Purple



Purple Yellow Orange Red



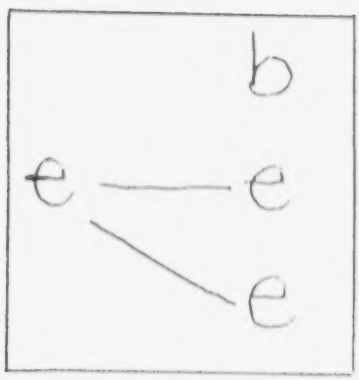
Visual Sequencing
Lesson 4 - Objective 2

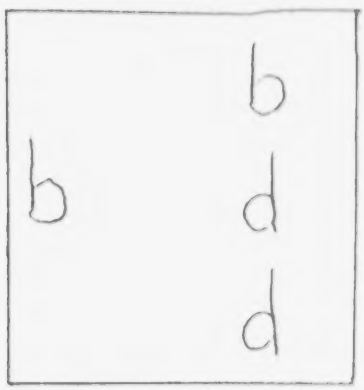


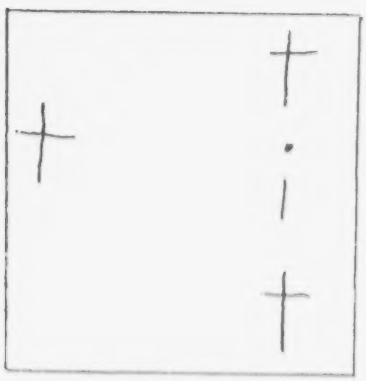
Letter Matching

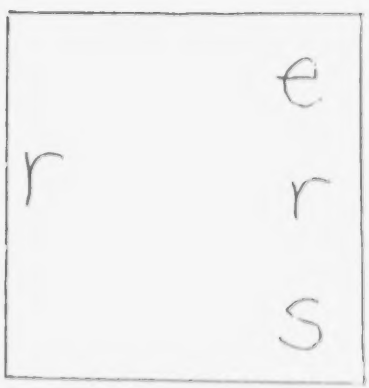
Lesson 6 - Objective 1

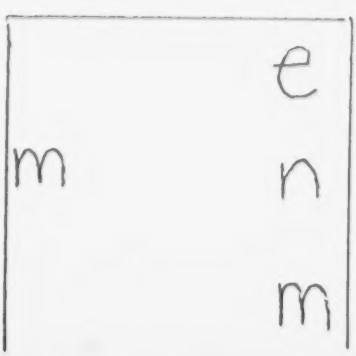
Match the letter or letters of the alphabet that are the same.





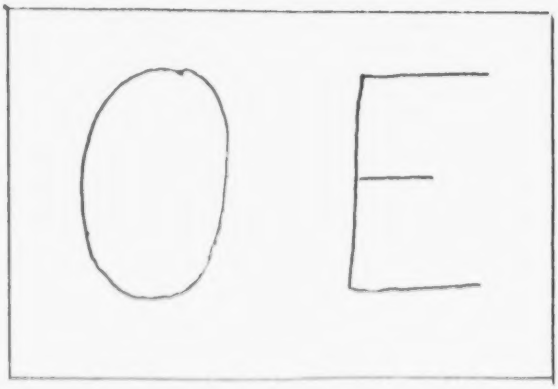


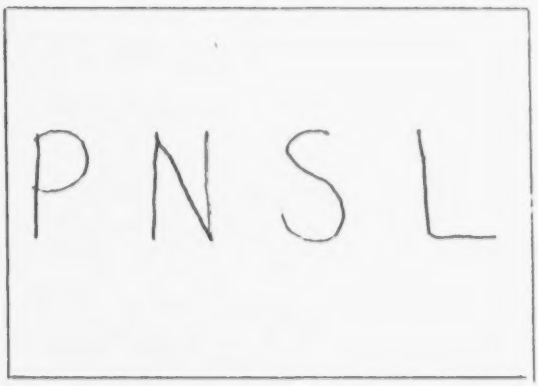


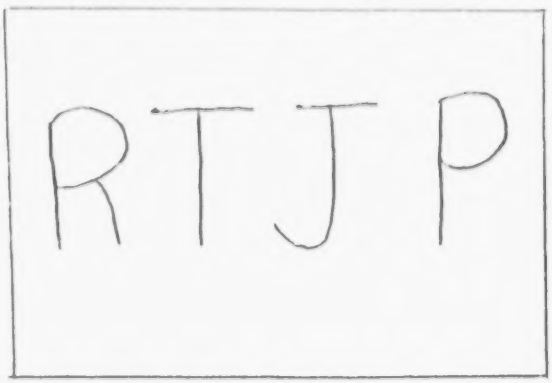


Letter Recall

Lesson 8



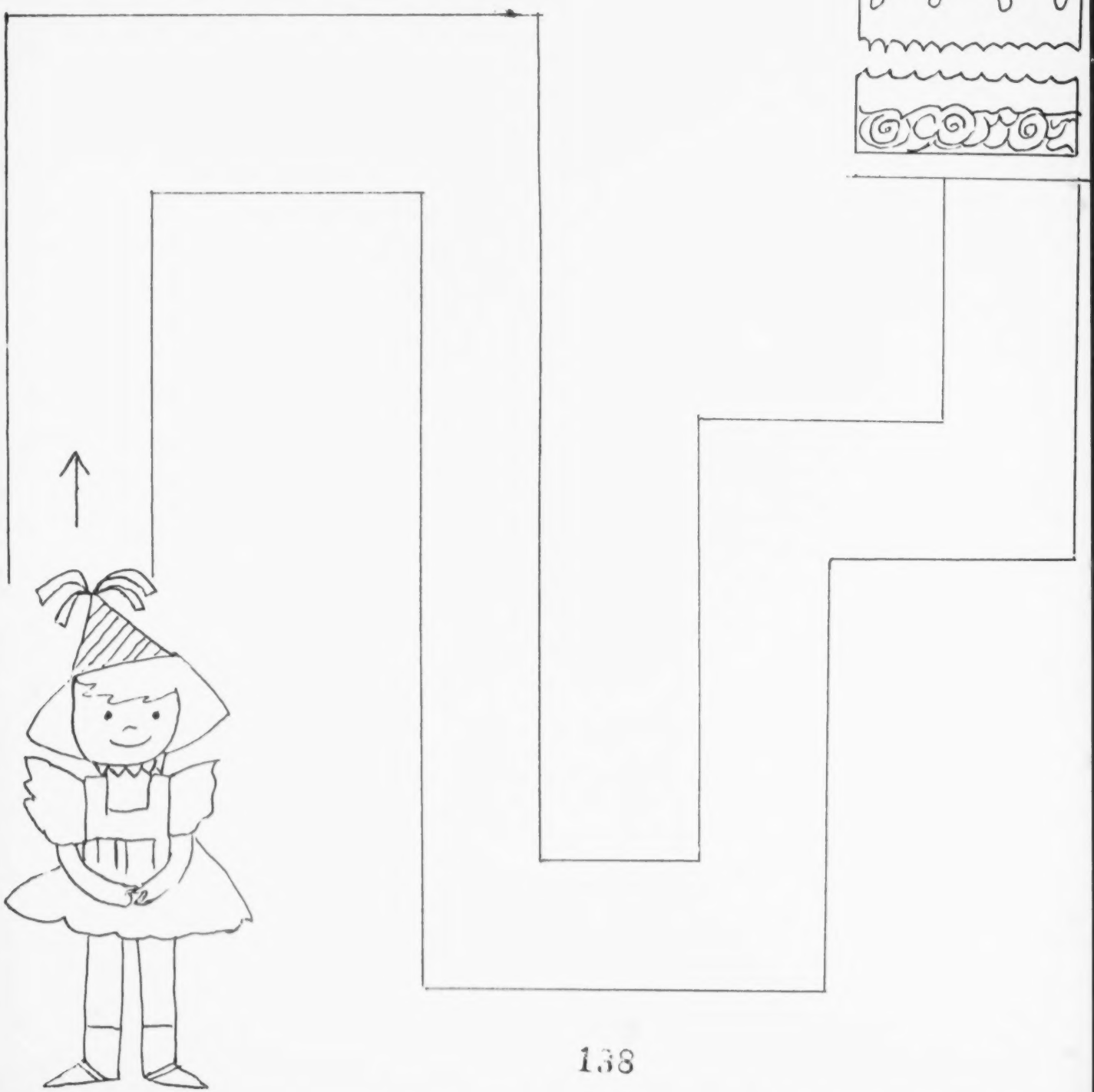




Eye-Hand Coordination

Lesson 9

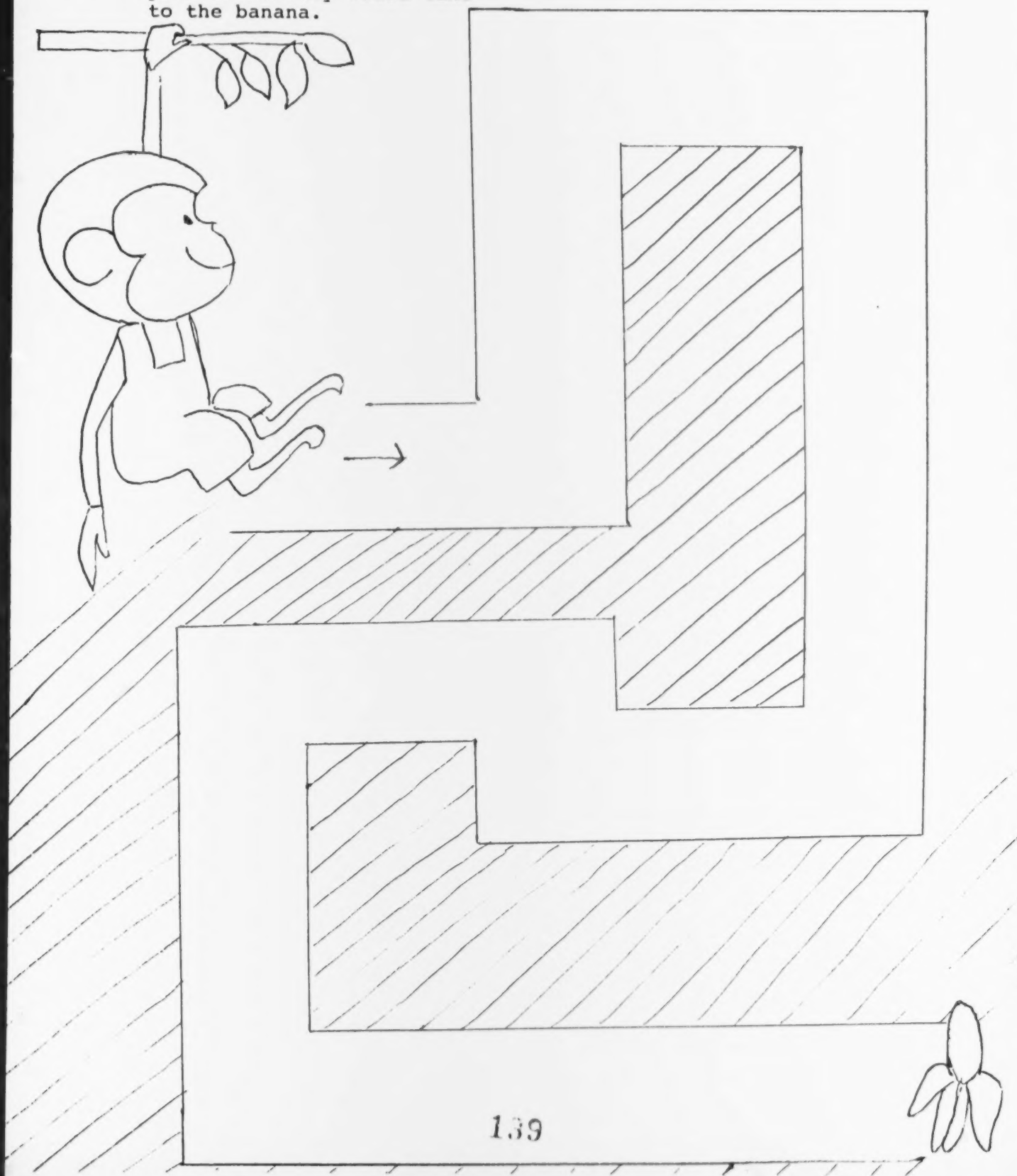
Directions: Draw the path the girl would take to get to the birthday cake.



Eye-Hand Coordination

Lesson 9

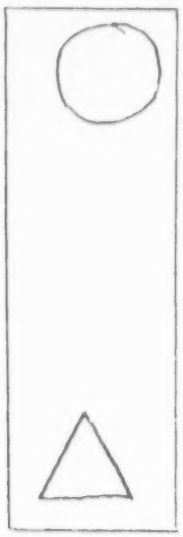
Directions: Draw the path the monkey would take to the banana.

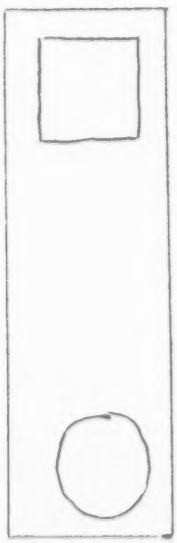


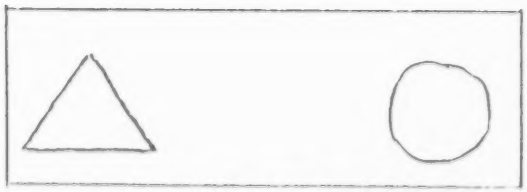
Cluster III: Conceptual Development

Lesson 1 - Objective 2

Shape Dominoes





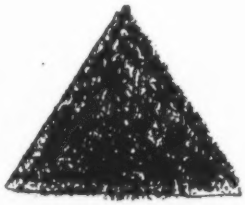
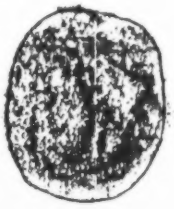
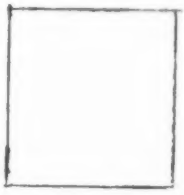
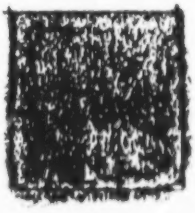
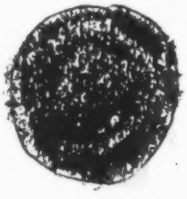
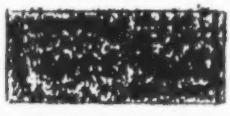


Word Recognition

Color Words

Cluster IV - Objective 1

COLOR BINGO

Red 	Orange 	Yellow 
Black	Brown 	Blue
Red 	Orange	Purple 

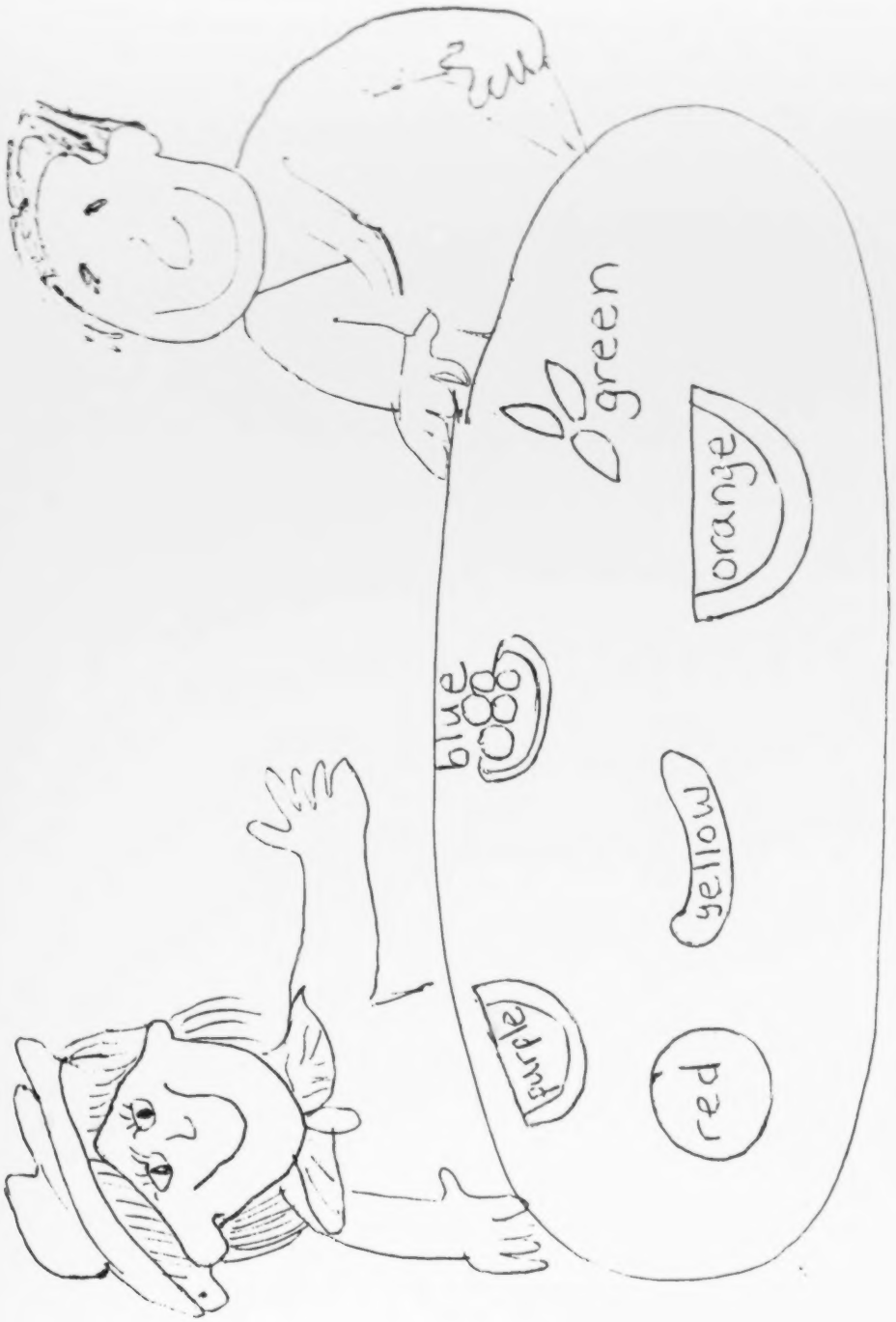
Word Recognition

Color Words

Cluster IV - Objective 1

143

Directions: Color the fruits on this table.



142

Word Recognition

Color Words

Cluster IV - Objective 1

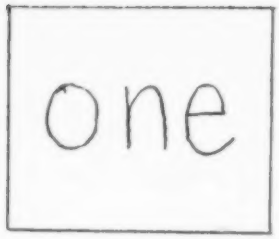
Color Word Trail

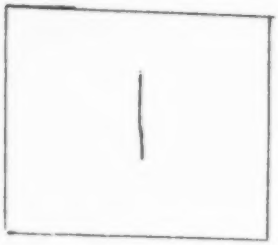
Directions:
1. Pick a card.
2. Move to the space with the name of the color
3. The first person to get to the house wins.

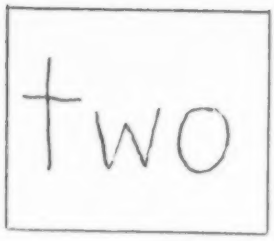
Word Recognition

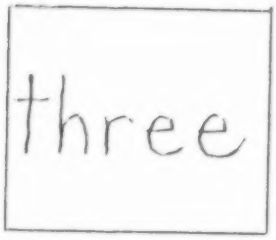
Number Words

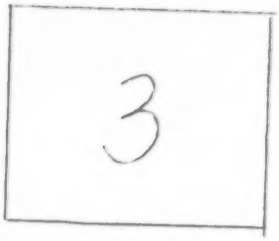
Cluster IV - Objective 2

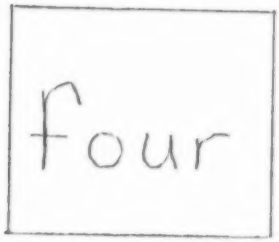


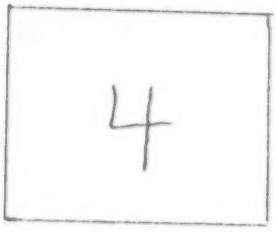


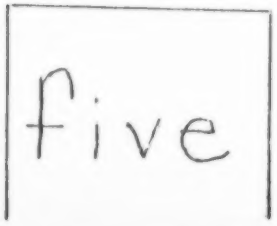


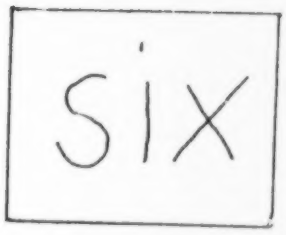








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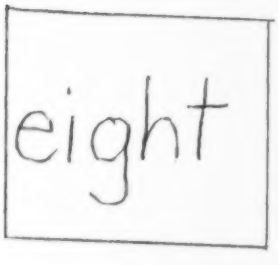
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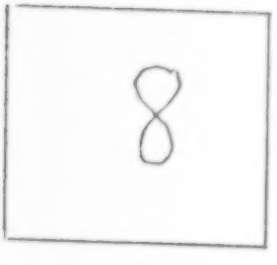
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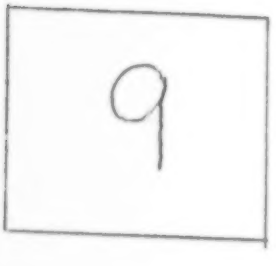
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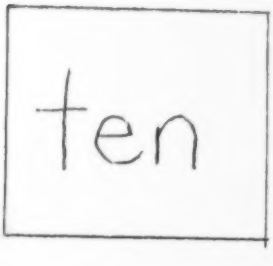
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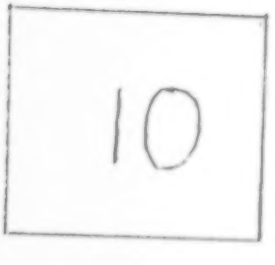
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APPENDIX L

CLASS ROSTER

STUDENTS' NEEDS IN READING READINESS

(CLASS ROSTER)

NAME OF STUDENT	Computer Literacy	Visual Discrimination	Visual Closure	Visual Memory	Visual Sequencing	Letter Recognition	Letter Matching	Letter Sequencing	Letter Recall	Eye-Hand Coordination	Vocabulary Formation	Classifying/ Categorizing	Word Recognition Color Words	Word Recognition Number Words	Beginning Sounds	Picture/Word Association	Words in Context	

147

148

150

Individual Student Skill Sheet

Student's Name: _____ Date: _____

Area Working On	Software Used	Skills Mastered (Y/N)	Concerns
Computer Literacy			
Visual Discrimination			
Visual Closure			
Visual Memory			
Visual Sequencing			
Letter Recognition			
Letter Matching			
Letter Sequencing			
Eye/Hand Coordination			
Vocabulary Formation			
Classifying/ Categorizing			
Word Recognition (Color Words)			
Word Recognition (Number Words)			
Beginning Sounds			
Picture/Word Association			
Words in Context			

Concerns or requests expressed by teacher: _____

_____

_____

Actions taken: _____

_____

APPENDIX N

GROUP FOLLOW-UP ACTIVITIES

Group Follow-up Activity

To review information discussed in computer class, the following activity is recommended to be done in the classroom:

_____

_____

_____

_____

_____

APPENDIX O

EVALUATION OF COMPUTER LITERACY SKILLS

156

Part I

Directions: I will be asking you to do things on the computer. Follow my directions when I have finished.

1. Remove the floppy disk from the envelope.
2. Place the floppy disk in the disk drive.
3. Turn on the monitor.
4. Turn on the main part of the computer.
5. Do you ever open the disk drive door when the red light is on?

Part II

Directions: Using the Apple IIe keyboard picture, color the letters or keys that I say.

1. R
2. A
3. N
4. B
5. Return key
6. Control key
7. L
8. Shift key
9. O
10. M

Results of Part II

The percentage of students answering correctly on each set was as follows:

1. 100%
2. 100%
3. 100%
4. 100%
5. 98%
6. 95%
7. 100%
8. 95%
9. 100%
10. 100%

APPENDIX P

Evaluation of Visual Discrimination Skills

Directions: Mark the letter that is different in each set.

1.	q	g	w	g
2.	s	a	a	a
3.	e	y	e	e
4.	m	m	m	l
5.	b	v	b	b
6.	x	x	x	c
7.	d	r	d	d
8.	o	o	j	o
9.	z	z	z	x
10.	s	s	S	s

Results of Visual Discrimination Evaluation: The percentage of students answering correctly on each set was as follows:

1. 95%
2. 100%
3. 98%
4. 98%
5. 100%
6. 100%
7. 98%
8. 100%
9. 98%
10. 88%

APPENDIX Q

End of Unit/Individual Student Progress Report

Child's Name: _____

Pre-reading Readiness

Skill Taught: _____

Skill Mastered: (Y/N) _____

Software Used: _____

APPENDIX R

Parent Report

Your child worked on

the computer today.

The skill he/she worked on was _____

_____

_____

_____

The computer program he/she used was _____

_____

_____

_____ HAD A GREAT DAY!

APPENDIX S

Final Teacher Evaluation

Instructions: Please circle your responses to the following questions.

5 = strongly agree
4 = agree
3 = undecided
2 = disagree
1 = strongly disagree

5	4	3	2	1	1.	I am able to use the computer with my students.
5	4	3	2	1	2.	I am familiar with computer terminology and the operation of the computer.
5	4	3	2	1	3.	I am now more familiar with available computer software.
5	4	3	2	1	4.	I can analyze new software to determine its appropriateness for my students.
5	4	3	2	1	5.	The computer guide helps me integrate computer software with my classroom instruction.
5	4	3	2	1	6.	The computer guide provides meaning to computer programs available at this center.
5	4	3	2	1	7.	I am interested in continuing to use the computer with my students.

Comments: _____

_____

_____

_____

_____

APPENDIX T

SUGGESTIONS FOR TEACHERS USING THE

COMPUTER-ASSISTED READING READINESS PROGRAM

Suggestions for Teachers

I. Before Working With Students

A. Determine the particular skills you wish to work on from the curriculum guide.

B. Preview the software you will be using before working with students. Be familiar with the specific program on the menu, and directions for operating that program.

C. Identify the follow-up activities that will follow the computer class.

II. When Working With Students

A. Have children sit on the floor and introduce the software to be used.

B. Have them work in pairs. Peer teaching is useful when using the computer.

C. Control-reset will often re-start a disk. If this does not work, type PR#6 when you see the blinking square.

D. If a disk is not working, check that the student has the disk in properly. Re-load it yourself. If it still does not work, it could be a defective disk or faulty disk drive. Try the disk on another computer (disk drive might not be working), or try a different disk (defective disk).

E. Remind students never to take out a disk when the red light is on the disk drive.

III. After Working With Students

A. Give each child a Parent Report to take home.

B. Do any follow-up activities that would reinforce that skill.

IV. At The End of a Skill Area

A. Use follow-up materials or teacher-made assessment tools to determine if students understand the skill taught.

B. Send home an Individual Progress Sheet indicating that the child has successfully completed that area.

C. Mark off on your class roster those children completing a particular skill.

APPENDIX U

FOLLOW-UP TEACHER INTERVIEWS 171

Interview with Teachers

1. Has the curriculum guide been easy to follow?

2. Have you been able to implement the follow-up activities in your classroom?

3. What do you see as the strengths of the guide?

4. What do you see as the weaknesses of the guide?

5. What additions would you make?

6. What changes or recommendations can you make to improve this curriculum guide?